ACTA·COLL·MED·PHILAD·INSTIT·A·D·MDCCLXXVII

Digitized by the Internet Archive
in 2013

http://archive.org/details/transactionsofco3171coll

The Jenks Prize Essay,

INFANTILE MORTALITY DURING CHILDBIRTH, AND ITS PREVENTION,

BY A. BROTHERS, B.S., M.D.,

is bound at the end of this volume.

TRANSACTIONS

OF THE

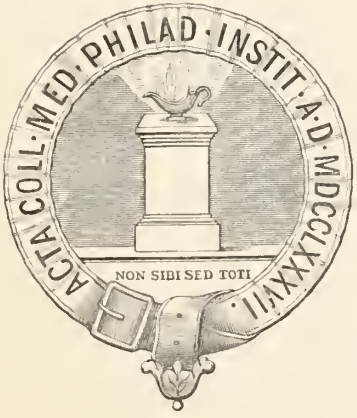
COLLEGE OF PHYSICIANS

OF

PHILADELPHIA.

THIRD SERIES.

VOLUME THE SEVENTEENTH.



PHILADELPHIA:
PRINTED FOR THE COLLEGE.
1895.

NOTICE

The present volume of Transactions contains the papers read before the College from January, 1895, to December, 1895, inclusive.

The Committee on Publication thinks it proper to say that the College holds itself in no way responsible for the statements, reasonings, or opinions set forth in the various papers published in its Transactions.

Edited by
GWILYM G. DAVIS.

DORNAN, PRINTER.

COLLEGE OF PHYSICIANS OF PHILADELPHIA

1895

OFFICERS AND STANDING COMMITTEES

PRESIDENT

J. M. DA COSTA, M.D.

VICE-PRESIDENT

JOHN ASHHURST, Jr., M.D.

CENSORS

Alfred Stillé, M.D. — William Hunt, M.D. (Resigned March 6, 1895)
William F. Norris, M.D. — Richard A. Cleemann, M.D.
Arthur V. Meigs, M.D. (Elected April 3, 1895.)

SECRETARY

Charles W. Dulles, M.D.

TREASURER

Henry M. Fisher, M.D.

HONORARY LIBRARIAN

Frederick P. Henry, M.D.

COUNCILLORS

To serve until January, 1896

Hobart A. Hare, M.D. — Thomas H. Fenton, M.D.

To serve until January, 1897

Louis Starr, M.D. — Richard H. Harte, M.D.

To serve until January, 1898

Henry R. Wharton, M.D. — Thomas S. K. Morton, M.D.

COMMITTEE OF PUBLICATION

Arthur V. Meigs, M.D., *Chairman* (Resigned from Com. April 3, 1895)
Gwilym G. Davis, M.D., *Chairman* — Thomas R. Neilson, M.D.
Damaso T. Lainé (Elected May 1, 1895)

LIBRARY COMMITTEE

George C. Harlan, M.D., *Chairman* — Charles A. Oliver, M.D.
Charles B. Penrose, M.D. — F. X. Dercum, M.D.
William J. Taylor, M.D. — The Honorary Librarian, *ex-officio*

COMMITTEE ON MÜTTER MUSEUM

William Hunt, M.D., *Chairman* (Resigned Chairmanship Feb. 25, 1895)
John H. Brinton, M.D., *Chairman* — Harrison Allen, M.D.

HALL COMMITTEE

J. Ewing Mears, M.D., *Chairman* William Barton Hopkins, M.D.
Morris J. Lewis, M.D. J. K. Mitchell, M.D.
Caspar Morris, M.D. (Elected February 6, 1895)

COMMITTEE ON THE DIRECTORY FOR NURSES

Wharton Sinkler, M.D., *Ch'n* James C. Wilson, M.D.
James V. Ingham, M.D.

COMMITTEE ON FINANCE

I. Minis Hays, M.D., *Chairman* Charles Stewart Wurts, M.D.
William Thomson, M.D.
The President and the Treasurer, *ex-officio*

COMMITTEE ON WILLIAM F. JENKS PRIZE (Until Feb. 1896)

Horace Y. Evans, M.D., *Chairman* Edward P. Davis, M.D.
Edward L. Duer, M.D.

COMMITTEE ON ENTERTAINMENTS

J. Madison Taylor, M.D., *Chairman* John B. Shober, M.D.
Louis Starr, M.D. Robert G. LeConte, M.D.
The President, *ex-officio*

COMMITTEE ON ALVARENGA PRIZE

John Guitéras, M.D., *Chairman* J. P. C. Griffith, M.D.
Orville Horwitz, M.D. H. Forde Hansell, M.D.
Arthur Van Harlingen, M.D.

TRUSTEES OF WILLIAM F. JENKS MEMORIAL FUND

James V. Ingham, M.D. (Original)
Wm. S. W. Ruschenberger, M.D. (Original. Died March 24, 1895)
Charles Stewart Wurts, M.D. (Elected by Council March 26, 1890)
Horace Y. Evans, M.D. (Elected by Council October 29, 1895)
The Chairman of the Committee on Finance, *ex officio*

SECTIONS

Ophthalmology—*Chairman*, W. F. Norris, M.D.
Clerk, C. A. Oliver, M.D.

Orthopedic Surgery—*Chairman*, F. X. Dercum, M.D.
Clerk, W. J. Taylor, M.D.

Otology and Laryngology—*Chairman*, Harrison Allen, M.D.
Clerk, C. H. Burnett, M.D.

General Surgery—*Chairman*, O. H. Allis, M.D.
Clerk, A. C. Wood, M.D.

Gynecology—*Chairman*, C. B. Penrose, M.D.
Clerk, J. B. Shober, M.D.

LIST

OF THE

PRESIDENTS OF THE COLLEGE FROM THE TIME OF ITS INSTITUTION

ELECTED	
1787	JOHN REDMAN
1805	WILLIAM SHIPPEN
1809	ADAM KUHN
1818	THOMAS PARKE
1835	THOMAS C. JAMES
1835	THOMAS T. HEWSON
1848	GEORGE B. WOOD
1879	W. S. W. RUSCHENBERGER
1883	ALFRED STILLÉ
1884	SAMUEL LEWIS
1884	J. M. DA COSTA
1886	S. WEIR MITCHELL
1889	D. HAYES AGNEW
1892	S. WEIR MITCHELL
1895	J. M. DA COSTA

FELLOWS

OF THE

COLLEGE OF PHYSICIANS OF PHILADELPHIA

DECEMBER, 1895

* Non-resident Fellows.
† Fellows who have commuted dues.
° Fellows made free of dues by the College.

ELECTED

*1883. Abbot, Griffith E., Ph.D., M.D., Washington, D. C.

1892. Abbott, Alex. C., M.D., First Assistant, Laboratory of Hygiene, University of Pennsylvania.

1870. Adler, John M., M.D.

1876. Alison, Robert H., M.D.

1867. Allen, Harrison, M.D., Professor of Zoölogy and Comparative Anatomy in the University of Pennsylvania.

1873. Allis, Oscar H., M.D., Clinical Lecturer on Orthopædic Surgery in Jefferson Medical College, and Surgeon to the Hospital of the same; Surgeon to the Presbyterian Hospital.

1888. Anders, James M., M.D., Professor of Hygiene and Clinical Diseases of Children in the Medico-Chirurgical College, Philadelphia; Physician to the Philadelphia Hospital.

1869. Andrews, T. Hollingsworth, M.D., Consulting Surgeon to the Hospital of the Good Shepherd, Radnor; Medical Director of the Bureaus of Police and of Fire in the Department of Public Safety.

ELECTED

*1882. Ashbridge, Richard, M.D., West Whiteland, Pa.

1863. Ashhurst, John, Jr., M.D., LL.D., Barton Professor of Surgery and Professor of Clinical Surgery in the University of Pennsylvania; Surgeon to the Pennsylvania Hospital and to the Children's Hospital; Consulting Surgeon to St. Christopher's Hospital, to the Woman's Hospital, and to the Hospital of the Good Shepherd, Radnor.

1865. Ashhurst, Samuel, M.D., Surgeon to the Children's Hospital.

1893. Ashton, Thomas G., M.D., Chief of Out-patient Medical Department, Jefferson Medical College Hospital; Demonstrator of Clinical Medicine, Jefferson Medical College; Visiting Physician to St. Mary's Hospital, Philadelphia.

1857. Atlee, Walter Franklin, A.M., M.D., Corresponding Member of La Société des Sciences Médicales de Lyons; Consulting Surgeon to St. Luke's Hospital, Bethlehem; Visiting Physician to the Preston Retreat.

1852. Bache, Thomas Hewson, M.D.

1883. Baer, Benjamin F., M.D., Professor of Gynecology in the Philadelphia Polyclinic.

†1892. Baker, George Fales, B.S., M.D., Surgeon to Out-patient Department of St. Joseph's Hospital.

1879. Baker, Washington H., M.D., Obstetrician to the Maternity Hospital.

1889. Baldy, John Montgomery, M.D., Professor of Gynecology in the Philadelphia Polyclinic; Surgeon to the Gynecean Hospital and to the Gynæcological Out-Patient Department of the Pennsylvania Hospital.

1880. Bartholow, Roberts, M.D., Professor (Emeritus) of Materia Medica, General Therapeutics and Hygiene in Jefferson Medical College.

1894. Barton, James M., M.D., Surgeon to the Jefferson Medical College Hospital and to the Philadelphia Hospital.

ELECTED

1883. Baum, Charles, M.D., A.M., Ph.D.

1873. Baxter, H. F., M.D.

1883. Beates, Henry, M.D.

1860. Benner, Henry D., M.D.

1874. Bennett, W. H., M.D., Physician-in-charge to the Children's Seashore House for Invalid Children, and to the Seaside House for Invalid Women, Atlantic City.

†1884. Biddle, Alexander W., M.D.

1884. Biddle, Thomas, M.D.

*1866. Black, J. J., M.D., New Castle, Del.

1894. Bliss, Arthur Ames, M.D., Laryngologist to the German Hospital; Laryngologist and Aurist to the Pennsylvania Institution for the Deaf and Dumb.

*1867. Boardman, Charles H., M.D., Boston, Mass.

1894. Bochroch, Max H., Instructor in Electro-therapeutics and Chief Clinical Assistant in the Nervous Department, Jefferson Medical College Hospital.

1891. Boyd, George M., M.D., Physician to the Philadelphia Lying-in Charity; Surgeon to the Out-door Department, Episcopal Hospital; Assistant Surgeon to the Kensington Hospital for Women.

†1884. Bradford, Thomas Hewson, M.D., Physician to the Dispensary of the Children's Hospital and Surgeon to the Gynæcological Out Patient Department of the Pennsylvania Hospital.

1856. Brinton, John H., M.D., Professor of the Practice of Surgery and of Clinical Surgery in the Jefferson Medical College; Consulting Surgeon to the Southwestern Hospital of Philadelphia.

1891. Brinton, Lewis, M.D., Visiting Physician to the Nervous Department of Howard Hospital.

1887. Brubaker, Albert P., M.D., Professor of Physiology and General Pathology in the Pennsylvania College of Dental Surgery; Demonstrator of Physiology in Jefferson Medical College; Lecturer on Anatomy and Physiology at the Drexel Institute.

ELECTED

*1890. Brush, Edward N., M.D., Medical Superintendent of the Sheppard Asylum, Towson, Md.

*1851. Bullock, William R., M.D., Wilmington, Del.

1887. Bunting, Ross R., M.D.

1870. Burnett, Charles H., M.D., Professor (Emeritus) of Otology in the Philadelphia Polyclinic; Clinical Professor of Otology in the Woman's Medical College; Aural Surgeon, Presbyterian Hospital; and Consulting Aurist to the Pennsylvania Institution for the Deaf and Dumb, West Philadelphia Hospital for Women, and the Bryn Mawr Hospital.

1892. Burr, Charles W., M.D., Clinical Professor of Nervous Diseases, Medico Chirurgical College; Professor of Mental and Nervous Diseases, Philadelphia Polyclinic.

1886. Cadwalader, Charles E., M.D.

1895. Carey, William A., M.D.

1895. Carpenter, John T., M.D., Adjunct Professor of Diseases of the Eye, Philadelphia Polyclinic; Assistant Surgeon to Wills Hospital; Ophthalmologist to the New Jersey Training School, Vineland, N. J.

1892. Cattell, Henry W., M.D., Demonstrator of Morbid Anatomy in the University of Pennsylvania; Pathologist to the Presbyterian Hospital.

*1892. Cerna, David, M.D., Ph.D., Demonstrator of Physiology in the Department of Medicine of the University of Texas; Corresponding Fellow of the Sociedad Española de Higiene of Madrid; Galveston, Texas.

1885. Chapin, John B., M.D., Physician to the Pennsylvania Hospital for the Insane.

1880. Chapman, Henry C., M.D., Professor of the Institutes of Medicine and of Medical Jurisprudence in Jefferson Medical College.

1868. Cheston, D. Murray, M.D.

1873. Clark, Leonardo S., M.D.

1872. Cleemann, Richard A., M.D.

*1842. Clymer, Meredith, M.D., New York.

ELECTED

1871. Cohen, J. Solis, M.D., Professor (Emeritus) of Diseases of the Throat and Chest in the Philadelphia Polyclinic; Professor (Honorary) of Laryngology in Jefferson Medical College; Consulting Physician to the Home for Consumptives, Philadelphia.

1888. Cohen, Solomon Solis, M.D., Professor of Clinical Medicine and Therapeutics in the Philadelphia Polyclinic; Lecturer on Clinical Medicine in the Jefferson Medical College; Physician to the Philadelphia Hospital, to the Rush Hospital, and to the Polyclinic Hospital; Consulting Physician to the Jewish Hospital; Consulting Laryngologist to the Pennsylvania Training School for Feeble-minded Children.

1895. Cross, William A., M.D.

1866. Cruice, R. B., M.D., Surgeon to St. Joseph's Hospital.

1884. Curtin, Roland G., M.D., Lecturer on Physical Diagnosis in the University of Pennsylvania; Assistant Physician to the University Hospital; Physician to the Philadelphia and Presbyterian Hospitals.

1884. Da Costa, John C., M.D., Gynecologist to Jefferson Medical College Hospital and to St. Agnes's Hospital.

†1858. Da Costa, J. M., M.D., LL.D., Professor (Emeritus) of the Principles and Practice of Medicine in Jefferson Medical College; Physician to the Pennsylvania Hospital; Consulting Physician to the Children's Hospital and to the Northern Dispensary.

1887. Daland, Judson, M.D., Instructor in Clinical Medicine and Lecturer on Physical Diagnosis in the University of Pennsylvania; Assistant Physician to the Hospital of the University of Pennsylvania; Director of the Stetson Laboratory of Hygiene.

1859. Darrach, James, M.D., Consulting Surgeon to the Germantown Hospital.

1888. Davis, Edward P., M.D., Professor of Obstetrics and Diseases of Infancy in the Philadelphia Polyclinic;

ELECTED

Clinical Professor of Obstetrics in the Jefferson Medical College; Clinical Professor of Pædiatrics in the Woman's Medical College; Visiting Obstetrician to the Philadelphia Hospital; Physician to the Children's Department of the Howard Hospital; Member of the American Gynecological Society and of the American Pædiatric Society.

1889. Davis, Gwilym G., M.D., M.R.C.S. Eng., Surgeon to the German and St. Joseph's Hospitals; Assistant Surgeon to the Orthopædic Hospital; Assistant Demonstrator of Surgery in the University of Pennsylvania.

1874. Deakyne, A. C., M.D.

1894. Deaver, Henry C., M.D., Surgeon to the Episcopal and St. Mary's Hospitals and to St. Christopher's Hospital for Children; Assistant Demonstrator of Anatomy, University of Pennsylvania.

1887. Deaver, John B., M.D., Professor of Surgery in the Philadelphia Polyclinic; Assistant Professor of Applied Anatomy in the University of Pennsylvania; Attending Surgeon to the German and Philadelphia Hospitals; Consulting Surgeon to St. Agnes's, Germantown, and St. Timothy's Hospitals.

1892. Deaver, Richard Wilmot, M.D.

1885. Dercum, Francis X., M.D., Clinical Professor of Neurology in Jefferson Medical College; Neurologist to the Philadelphia Hospital.

1891. Dixon, Samuel G., M.D., Professor of Microscopic Technology and Histology, and Curator of the Academy of Natural Sciences of Philadelphia.

1891. Dixon, William C., M.D., Physician to the Industrial Home for Blind Women, Philadelphia; Physician to the Shelter for Colored Orphans, Philadelphia; Member of Consulting Staff, Philadelphia Home for Incurables; Examiner of Insane Patients, Philadelphia Hospital.

1893. Downs, Norton, M.D.

1864. Downs, R. N., M.D.

ELECTED

1884. Drysdale, T. M., M.D.

1864. Duer, Edward L., M.D., Accoucheur to the Philadelphia Hospital; Surgeon to the Maternity Hospital; Visiting Physician to the Preston Retreat.

1871. Duhring, L. A., M.D., Professor of Skin Diseases in the University of Pennsylvania.

1881. Dulles, Charles Winslow, M.D., Surgeon to Rush Hospital; Surgeon to Out-patients, Presbyterian Hospital; Lecturer on History of Medicine, University of Pennsylvania.

1863. Dunglison, Richard J., M.D.

*1871, Dunglison, Thomas R., M.D., Paris, France.

1888. Dunn, Thomas D., M.D.

*1849. Dunott, Justus, M.D., Harrisburg, Pa.

1860. Dunton, William R., M.D., Consulting Physician to the Germantown Hospital.

*1882. Edwards, Joseph F., M.D., Atlantic City, N. J.

*1887. Edwards, William A., M.D., San Diego, California.

1893. Eshner, Augustus A., M.D., Professor of Clinical Medicine in the Philadelphia Polyclinic; Registrar in the Neurological Department of the Philadelphia Hospital.

*1880. Eskridge, J. T., M.D., Denver, Colorado.

1868. Evans, Horace Y., M.D., Physician to the Charity Hospital.

1894. Faries, Randolph, M.D., Surgeon to the Orthopædic Dispensary in the University of Pennsylvania; Director of Physical Education, University of Pennsylvania and Protestant Episcopal Academy, Philadelphia.

1893. Farr, William W., M.D., Surgeon to the Out-patient Department of the Episcopal Hospital; Visiting Physician to the Sheltering Arms and to the Church Home for Children.

ELECTED

1884. Fenton, Thomas H., M.D., Medical Director and Senior Ophthalmologist of the Union Mission Hospital; Ophthalmologist to St. Vincent's Home and to the Home for Aged Couples.

1866. Fischer, Emil, M.D.

1884. Fisher, Henry M., M.D., Physician to the Episcopal Hospital; Microscopist to the Pennsylvania Hospital and Physician to the Out-patient Department of the same.

1888. Flick, Lawrence F., M.D.

1862. Forbes, William S., M.D., Professor of Anatomy in Jefferson Medical College.

1870. Ford, William H., M.D., President of the Board of Health of Philadelphia; Physician to the Foster Home.

†1885. Fox, Joseph M., M.D., Leesburg, Va.

1890. Freeman, Walter J., M.D., Professor of Laryngology in the Philadelphia Polyclinic; Laryngologist to the Out-patient Department of the Children's Hospital; Consulting Laryngologist to the Pennsylvania Institution for the Deaf and Dumb.

1885. Fricke, Albert, M.D.

1893. Friebis, George, M.D., Ophthalmic Surgeon to the Mary Drexel Home and to the German Hospital.

1889. Fussell, M. Howard, M.D., Chief Physician to the Medical Dispensary of the University of Pennsylvania; Instructor in Clinical Medicine in the University of Pennsylvania.

1873. Gerhard, George S., M.D.

1864. Getchell, F. H., M.D.

1892. Gibb, Joseph S., M.D., Adjunct Professor of Diseases of the Throat and Nose in the Philadelphia Polyclinic; Surgeon to the Ear, Nose, and Throat Department of the Episcopal Hospital.

1894. Gillespie, John, M.D., one of the Physicians to the Children's Hospital.

ELECTED

1885. Girvin, Robert M., M.D., Gynecologist to the Presbyterian Hospital.

1889. Githens, William H. H., M.D., Visiting Physician to the Sheltering Arms.

1894. Gleason, E. Baldwin, M.D., Clinical Professor of Otology in the Medico-Chirurgical College; Surgeon-in-charge of the Nose, Throat, and Ear Department, Northern Dispensary.

*1893. Gobrecht, William, M.D., Washington, D. C.

1884. Godey, Harry, M.D.

1893. Goodell, W. Constantine, M.D., Clinical Instructor in Gynecology in the University of Pennsylvania; Assistant Gynecologist, University Hospital.

1867. Goodman, H. Ernest, M.D., Professor of Surgery in the Medico-Chirurgical College; Surgeon to Wills Eye Hospital and to the Orthopædic Hospital; Consulting Surgeon to the Maternity Hospital.

1894. Graham, Edwin E., M.D., Clinical Professor of Diseases of Children in the Jefferson Medical College; Physician to the Franklin Reformatory Home.

1885. Graham, John, M.D.

1891. Green, Walter D., A.M., M.D., Out-patient Surgeon to the Pennsylvania, Children's, and Methodist Hospitals; Assistant Surgeon to the Gynecean Hospital.

1870. Grier, M. J., M.D.

1883. Griffith, J. P. Crozer, M.D., Clinical Professor of the Diseases of Children in the Hospital of the University of Pennsylvania; Professor of Clinical Medicine in the Philadelphia Polyclinic; Physician to St. Agnes's, the Children's, the Howard, and the Rush Hospitals.

1871. Grove, John H., M.D., Surgeon to St. Mary's and to St. Agnes's Hospitals.

1889. Guitéras, John, M.D., Professor of General Pathology and Morbid Anatomy in the University of Pennsylvania.

ELECTED

1893. Hamill, Robert H., M.D.

1894. Hamill, Samuel McC., Demonstrator of Physical Diagnosis, University of Pennsylvania; Assistant Physician to the Medical Dispensary of the Hospital of the University of Pennsylvania; Visiting Physician to the Baptist Orphanage.

*1859. Hammond, William A., M.D., Surgeon-General U. S. A. (Retired), Washington, D. C.

1886. Hansell, Howard F., M.D., Clinical Professor of Ophthalmology, Jefferson Medical College; Professor of Diseases of the Eye, Philadelphia Polyclinic; Consulting Ophthalmologist, Chester County Hospital; Ophthalmologist, Frederick Douglass Memorial Hospital.

1889. Hare, Hobart A., M.D., Professor of Therapeutics in Jefferson Medical College; Physician to St. Agnes's Hospital and to Jefferson Medical College Hospital.

1865. Harlan, George C., M.D., Surgeon to Wills Eye Hospital and to the Eye and Ear Department of the Pennsylvania Hospital; Professor (Emeritus) of Diseases of the Eye in the Philadelphia Polyclinic.

1862. Harris, Robert P., M.D.

1885. Harte, Richard H., M.D., Surgeon to Pennsylvania Hospital; Surgeon to Episcopal Hospital; Surgeon to St. Mary's Hospital; Consulting Surgeon to St. Timothy's Hospital; Demonstrator of Osteology, University of Pennsylvania.

1851. Hartshorne, Henry, M.D., LL.D.

1888. Hartzell, Milton B., M.D., Instructor in Dermatology, University of Pennsylvania.

1872. Hays, I. Minis, M.D.

1882. Hearn, W. Joseph, M.D., Surgeon to the Hospital of Jefferson Medical College and to the Philadelphia Hospital.

1884. Henry, Frederick P., M.D., Physician to Jefferson Medical College Hospital and to the Philadelphia Hospital; Professor of the Principles and Practice of Medicine in the Woman's Medical College of Pennsylvania.

ELECTED

1891. Hewson, Addinell, A.M., M.D., Demonstrator of Anatomy in Jefferson Medical College; Dispensary Surgeon to the Hospital of the Protestant Episcopal Church.

1872. Hinkle, A. G. B., M.D.

1892. Hinsdale, Guy, M.D., Physician to the Presbyterian Orphanage and to the Out-patient Department of the Presbyterian Hospital; Assistant Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases.

1888. Hirsh, Abram B., M.D., Physician to Charity Hospital.

1888. Hirst, Barton Cooke, M.D., Professor of Obstetrics in the University of Pennsylvania; Obstetrician to the Philadelphia Hospital and to the Maternity Hospital.

1894. Hoch, William R., M.D., Instructor in Laryngology, University of Pennsylvania; Laryngologist to Rush Hospital, and to Methodist Episcopal Hospital.

1885. Holland, James W., M.D., Professor of Medical Chemistry and Toxicology in Jefferson Medical College.

†1879. Hopkins, William Barton, M.D., Senior Surgeon to the Episcopal Hospital and to the Orthopædic Department of the Pennsylvania Hospital.

1867. Horn, George H., M.D., Professor of Entomology in the Biological Department of the University of Pennsylvania.

1888. Horwitz, Orville, M.D., Clinical Professor of Genito-urinary Diseases in Jefferson Medical College; Professor of Genito-urinary Surgery in the Philadelphia Polyclinic, and Surgeon to the Philadelphia Hospital.

1868. Howell, Samuel B., M.D., Professor of Chemistry in the Medico-Chirurgical College.

1892. Hughes, William E., M.D., Professor of Clinical Medicine in the Medico-Chirurgical College; Visiting Physician to the Philadelphia and Medico-Chirurgical Hospitals; Pathologist to the Presbyterian Hospital.

°1854. Hunt, William, M.D.

1871. Ingham, James V., M.D.

ELECTED

1885. Jackson, Edward, M.D. Professor of Diseases of the Eye in the Philadelphia Polyclinic; Surgeon to Wills Eye Hospital; Ophthalmologist to Rush Hospital.

1887. Jayne, Horace, M.D., Professor of Vertebrate Morphology in the Biological Department of the University of Pennsylvania.

1885. Judd, Leonardo Da Vinci, M.D.

1867. Judson, Oliver A., M.D.

1886. Jurist, Louis, M.D., Chief Clinical Assistant in the Laryngological Department of Jefferson Medical College Hospital.

†1867. Keen, William W., M.D., LL.D., Professor of the Principles of Surgery and of Clinical Surgery in Jefferson Medical College; Surgeon to Jefferson Medical College Hospital and to the Orthopædic Hospital and Infirmary for Nervous Diseases, and Consulting Surgeon to St. Agnes's Hospital and to the Woman's Hospital; Membre Correspondant Étranger de la Société de Chirurgie de Paris; Membre Honoraire de la Société Belge de Chirurgie.

*1887. Kelly, Howard A., M.D., Professor of Gynecology in the Johns Hopkins University, and Gynecologist and Obstetrician to the Hospital, Baltimore, Md.

*1844. King, Charles R., M.D., Andalusia, Pa.

†1875. Kirkbride, Joseph J., M.D.

1892. Lainé, Damaso T., M.D.

*1865. La Roche, C. Percy, M.D., Rome, Italy.

1887. Leaman, Henry, M.D.

1893. LeConte, Robert G., M.D., Surgeon to the Methodist Episcopal Hospital and to the Out-patient Departments of the Pennsylvania Hospital and Children's Hospital; Assistant Surgeon to the Gynecean Hospital and in the Genito-urinary Department of the University of Pennsylvania.

ELECTED

1883. Leffmann, Henry, M.D., Professor of Chemistry in the Philadelphia Polyclinic and in the Woman's Medical College; Pathological Chemist to Jefferson Medical College Hospital.

1892. Leidy, Joseph, M.D., Physician to the Out-patient Department of the Pennsylvania Hospital; Assistant Surgeon in the Genito-urinary Department of the University of Pennsylvania.

1855. Lewis, Francis W., M.D.

1877. Lewis, Morris J., M.D., Physician to the Children's Hospital, to the Orthopædic Hospital and Infirmary for Nervous Diseases, and to the Pennsylvania Hospital.

1886. Lloyd, J. Hendrie, M.D., Physician to the Nervous and Insane Department of the Philadelphia Hospital, to the Methodist Episcopal Hospital, and to the Home for Crippled Children.

1893. Longaker, Daniel, M.D.

1877. Longstreth, Morris, M.D., Professor of Pathological Anatomy in Jefferson Medical College; Physician to the Pennsylvania Hospital.

1886. MacCoy, Alexander W., M.D., Professor of Diseases of the Throat and Nose in the Philadelphia Polyclinic; Lecturer on Diseases of the Throat and Nose in the Woman's Medical College of Pennsylvania.

*1885. Mallet, John W., M.D., Charlottesville, Va.

1893. Marshall, John, M.D., Assistant Professor of Chemistry in the University of Pennsylvania.

1889. Martin, Edward, M.D., Surgeon to the Howard Hospital; Clinical Professor of Genito-urinary Diseases in the University of Pennsylvania.

1887. Massey, Isaac, M.D., Surgeon to the Pennsylvania Railroad; Physician to the Chester County Hospital.

*1850. Mayer, Edward R., M.D., Wilkesbarre, Pa.

1885. Mays, Thomas J., M.D., Professor of Diseases of the Chest and of Experimental Therapeutics in the Philadelphia Polyclinic; Visiting Physician to Rush Hospital.

ELECTED

1875. McClellan, George, M.D., Surgeon to the Howard Hospital.

1895. McFarland, Joseph, M.D., Demonstrator of Pathological Histology and Lecturer on Bacteriology in the University of Pennsylvania; Pathologist to Rush Hospital.

1871. McFerran, J. A., M.D.

1868. Mears, J. Ewing, M.D., Professor of Anatomy and Clinical Surgery in the Pennsylvania College of Dental Surgery; Gynecologist to Jefferson Medical College Hospital; Surgeon to St. Agnes's Hospital.

1875. Meigs, Arthur V., M.D., Physician to the Pennsylvania Hospital; Consulting Physician to the Pennsylvania Institution for the Instruction of the Blind.

*1884. Mifflin, Houston, M.D., Columbia, Pa.

1894. Miller, D. J. Milton, M.D., Physician to the Episcopal Hospital; Assistant Physician to the Children's Hospital.

1881. Mills, Charles K., M.D., Professor of Mental Diseases and of Medical Jurisprudence in the University of Pennsylvania; Professor of Diseases of the Mind and Nervous System in the Philadelphia Polyclinic; Clinical Professor of Nervous Diseases in the Woman's Medical College; Neurologist to the Philadelphia Hospital.

†1888. Mitchell, John K., M.D., Instructor in Clinical Medicine in the University of Pennsylvania; Physician to St. Agnes's Hospital; Assistant Physician to the University Hospital and to the Infirmary for Nervous Diseases.

1856. Mitchell, S. Weir, M.D., Professor of Diseases of the Mind and Nervous System in the Philadelphia Polyclinic; Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Consulting Physician to the Maternity Hospital.

1882. Montgomery, Edward E., M.D., Clinical Professor of Gynecology in the Jefferson Medical College; Obstetrician to the Philadelphia Hospital.

1863. Morehouse, George R., M.D., Ph.D.

ELECTED

1886. Morris, Caspar, M.D., Physician to the Episcopal Hospital and to the Out-patient Department of the Pennsylvania Hospital.

1893. Morris, Elliston J., M.D.

1883. Morris, Henry, M.D., Gynecologist to the Howard Hospital.

1856. Morris, J. Cheston, M.D.

1861. Morton, Thomas G., M.D., Surgeon to the Pennsylvania and the Orthopædic Hospitals; Consulting Surgeon to the Jewish Hospital; Emeritus Surgeon to Wills Eye Hospital.

1891. Morton, T. S. K., M.D., Professor of Surgery in the Philadelphia Polyclinic; Surgeon to the Polyclinic Hospital; Assistant Surgeon to the Orthopædic Hospital; Surgeon to Out-patient Department of the Pennsylvania Hospital; Consulting Surgeon to the Philadelphia Dispensary.

1864. Moss, William, M.D.

1890. Müller, Auguste F., M.D., Attending Physician to the Germantown Hospital.

1882. Musser, John H., M.D., Assistant Professor of Clinical Medicine in the University of Pennsylvania; Physician to the Philadelphia Hospital and to the Presbyterian Hospital; Consulting Physician to the Woman's Hospital of Philadelphia and to the West Philadelphia Hospital for Women.

1886. Neff, Joseph F., M.D.

1887. Neilson, Thomas Rundle, M.D., Surgeon to the Episcopal Hospital and to St. Christopher's Hospital for Children; Professor of Genito-urinary Diseases in the Philadelphia Polyclinic; Lecturer on Diseases of the Rectum and Assistant Demonstrator of Anatomy in the University of Pennsylvania.

1889. Noble, Charles P., M.D., Surgeon-in-Chief to the Kensington Hospital for Women; Surgeon-in-Charge of the

ELECTED

Department for Women of the Northern Dispensary; Surgeon-in-Charge of the Department for Women of the Union Dispensary; Lecturer on Gynecology in the Philadelphia Polyclinic.

1893. Noble, William H., M.D.

1869. Norris, Herbert, M.D., Supervising Physician to St. Clement's Hospital.

1865. Norris, Isaac, Jr., M.D.

1892. Norris, Richard C., M.D., Lecturer on Clinical and Operative Obstetrics, University of Pennsylvania; Obstetrician-in-Charge, Preston Retreat; Visiting Obstetrician to the Philadelphia Hospital; Gynecologist to the Methodist Hospital; Consulting Obstetrician and Attending Gynecologist to the Southeastern Dispensary and Hospital.

1866. Norris, William F., M.D., Professor of Ophthalmology and Clinical Professor of Diseases of the Eye in the University of Pennsylvania; Surgeon to Wills Eye Hospital.

1884. Oliver, Charles A., M.D., Attending Surgeon to Wills Eye Hospital; Ophthalmic Surgeon to the Philadelphia and the Presbyterian Hospitals; Consulting Ophthalmic Surgeon to St. Agnes's, St. Mary's, St. Timothy's, and Maternity Hospitals; Consulting Ophthalmologist to the State Hospital for the Chronic Insane of Pennsylvania.

1884. O'Neill, J. W., M.D.

*1885. Osler, William, M.D., Professor of Medicine in Johns Hopkins University, and Physician to the Hospital, Baltimore, Md.

1890. Packard, Frederick A., M.D., Visiting Physician to the Philadelphia and Children's Hospitals; Physician to the Out-patient Department of the Pennsylvania Hospital; Instructor in Physical Diagnosis in the University of Pennsylvania.

ELECTED

1858. Packard, John H., M.D., Surgeon to the Pennsylvania Hospital and to St. Joseph's Hospital.

1864. Pancoast, William H., M.D., Professor of Anatomy and of Clinical Surgery in the Medico-Chirurgical College; Consulting Surgeon to the Philadelphia Hospital for Skin Disease.

1882. Parish, William H., M.D., Professor of Obstetrics in the Dartmouth Medical College; Professor of Anatomy in the Woman's Medical College of Pennsylvania; Consulting Obstetrician to the Lying-in Charity; Consulting Surgeon to the Kensington Hospital; Consulting Gynecologist to St. Agnes's Hospital.

1883. Parvin, Theophilus, M.D., Professor of Obstetrics and Diseases of Women and Children in the Jefferson Medical College.

†1889. Penrose, Charles Bingham, M.D., Professor of Gynecology in the University of Pennsylvania; Surgeon to the Gynecean Hospital.

1854. Penrose, R. A. F., M.D., LL.D., Professor (Emeritus) of Obstetrics and Diseases of Women and Children in the University of Pennsylvania; Consulting Obstetrician to the Maternity Hospital; Visiting Physician to the Preston Retreat.

1868. Pepper, William, M.D., LL.D., Professor of the Theory and Practice of Medicine in the University of Pennsylvania.

1884. Perkins, Francis M., M.D., Ophthalmic Surgeon to St. Agnes's Hospital; Ophthalmic Surgeon to the Presbyterian Hospital.

1890. Phillips, J. Willoughby, M.D.

1883. Piersol, George A., M.D., Professor of Anatomy in the University of Pennsylvania.

1872. Porter, William G., M.D., Surgeon to the Presbyterian Hospital and to the Philadelphia Hospital.

1885. Potter, Thomas C., M.D.

1887. Price, Jacob, M.D.

ELECTED

†1889. Price, Joseph, M.D., Obstetric Physician to the Philadelphia Dispensary.

1889. Randall, B. Alexander, M.D., Clinical Professor of Diseases of the Ear in the University of Pennsylvania and Professor of Diseases of the Ear in the Philadelphia Polyclinic; Ophthalmic and Aural Surgeon to the Children's Hospital; Otologist to Rush Hospital.

1887. Reed, Charles H., M.D.

1885. Reichert, Edward T., M.D., Professor of Physiology in the University of Pennsylvania.

1891. Rhoads, Edward G., M.D.

1895. Ring, Gassaway Oram, M.D., Ophthalmic Surgeon to the Episcopal Hospital, and Ophthalmic and Aural Surgeon to the Samaritan Hospital, Philadelphia.

1891. Risley, S. D., M.D., Lecturer on Ophthalmology in the University of Pennsylvania; Attending Surgeon at the Wills Eye Hospital; Professor of Ophthalmology in the Philadelphia Polyclinic and College for Graduates in Medicine.

1882. Roberts, A. Sydney, M.D.

†1878. Roberts, John B., M.D., Professor of Anatomy and Surgery in the Philadelphia Polyclinic; Professor of Surgery in the Woman's Medical College of Pennsylvania; Surgeon to the Methodist Hospital.

1888. Robins, Robert P., M.D., Visiting Physician to the Dispensary of the House of Industry, to the Church Home for Children, and to the Board of Guardians of the Poor; Lecturer on Chemistry in the Episcopal Academy.

*1864. Sargent, Winthrop, M.D., Roxbury, Mass.

†1866. Schaffer, Charles, M.D., Professor of Botany in the Pennsylvania Horticultural Society.

1887. De Schweinitz, George E., M.D., Clinical Professor of Ophthalmology in Jefferson Medical College; Professor of Ophthalmology in the Philadelphia Polyclinic; Oph-

ELECTED

thalmic and Aural Surgeon to the Children's Hospital; Ophthalmologist to the Orthopædic Hospital and to the Philadelphia Hospital; Consulting Ophthalmic Surgeon to the Methodist Episcopal Hospital.

1895. Scott, J. Alison, Demonstrator of Physical Diagnosis in the University of Pennsylvania; Physician to Out-patient Department, Pennsylvania Hospital; Physician to the Church Home; Assistant Medical Director of Penn Mutual Life Insurance Company.

1892. Seiss, Ralph W., M.D., Professor of Otology in the Philadelphia Polyclinic.

1888. Seltzer, Charles M., M.D.

1875. Seyfert, Theodore H., M.D.

1884. Shaffner, Charles, M.D., Ophthalmic Surgeon to the Presbyterian Hospital.

1887. Shakespeare, Edward O., M.D.

1876. Shippen, Edward, A.M., M.D., U. S. Navy (retired).

1891. Shober, John B., M.D., Surgeon to the University Hospital Dispensary and to the Gynecean Hospital Dispensary.

1890. Shoemaker, George Erety, A.M., M.D., Gynecologist to the Methodist Hospital and to the St. Clement's Hospital for Epilepties.

†1893. Shoemaker, Harvey, M.D., Visiting Physician to the Sheltering Arms; Physician to Out-patient Department of the German, Episcopal, and Children's Hospitals.

1880. Simes, J. H. C., M.D., Emeritus Professor of Genito-urinary and Venereal Diseases in the Philadelphia Polyclinic; Surgeon to St. Christopher's Hospital.

1873. Simpson, James, M.D.

1872. Sinkler, Wharton, M.D., Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Neurologist to the Philadelphia Hospital; Physician to the Epileptic Hospital of Philadelphia.

1895. Slocum, Harris A., M.D., Gynecologist to St. Clement's Hospital for Epilepties; Professor of Gynecology in the Philadelphia Polyclinic.

ELECTED

*1863. Smith, A. K., M.D., U. S. A. (retired), New Hartford, Conn.

*1864. Smith, Edward A., M.D., New York.

1895. Spellissy, Joseph M., M.D., Visiting Surgeon to St. Mary's Hospital; Out-patient Surgeon to the Pennsylvania, Methodist, and St. Agnes's Hospitals, and Assistant Surgeon to the Orthopædic Dispensary of the University Hospital.

1894. Stahl, B. Franklin, Ph.G., B.S., M.D., Instructor in Physical Diagnosis in the University of Pennsylvania; Visiting Physician to St. Agnes's Hospital; Ophthalmic Surgeon to Charity Hospital.

1875. Starr, Louis, M.D.

1892. Steinbach, Lewis W., M.D., Professor of Clinical and Operative Surgery in the Philadelphia Polyclinic; Visiting Surgeon to the Philadelphia Hospital and to the Jewish Hospital of Philadelphia.

1884. Stelwagon, Henry W., M.D., Ph.D., Clinical Professor of Dermatology in Jefferson Medical College; Dermatologist to the Philadelphia Hospital; Physician to the Department for Skin Diseases of the Howard Hospital and the Northern Dispensary; Clinical Professor of Dermatology in the Woman's Medical College.

1895. Stengel, Alfred, M.D., Instructor in Clinical Medicine, University of Pennsylvania; Assistant Physician, University Hospital; Physician to Howard Hospital; Pathologist to German Hospital; Medical Registrar to Philadelphia Hospital; Assistant Director, Pepper Laboratory of Clinical Medicine, University of Pennsylvania.

1888. Stewart, David D., M.D., Professor of Diseases of the Stomach and Intestines in the Philadelphia Polyclinic; Attending Physician to the Episcopal Hospital.

†1842. Stillé, Alfred, M.D., LL.D., Professor (Emeritus) of the Theory and Practice of Medicine in the University of Pennsylvania; Consulting Physician to the Maternity Hospital, to the Woman's Hospital, and to Rush Hospital.

ELECTED

°1846. Stocker, Anthony E., M.D.

1884. Stryker, Samuel S., M.D., Physician to the Presbyterian Hospital.

1866. Taylor, John Madison, M.D., Neurologist to Howard Hospital; Assistant Physician to the Orthopædic Hospital and Infirmary for Nervous Diseases; Assistant Physician to the Children's Hospital; Professor of Children's Diseases in the Philadelphia Polyclinic; Fellow of the American Academy of Medicine.

1887. Taylor, William J., M.D., Surgeon to St. Agnes's Hospital, and Assistant Surgeon to the Orthopædic Hospital and Infirmary for Nervous Diseases

1886. Taylor, William L., M.D., Instructor in Clinical Gynecology in the University of Pennsylvania, and Chief of the Clinic, and Assistant Gynecologist to the Hospital of the same; Surgeon-in-Chief to the Beacon Service for Women.

1867. Thomas, Charles Hermon, M.D.

†1869. Thomson, William, M.D., Professor (Honorary) of Ophthalmology in the Jefferson Medical College, and Ophthalmic Surgeon to the Hospital of the same; Emeritus Surgeon to Wills Eye Hospital.

1894. Tunis, Joseph Price, M.D., Assistant Demonstrator of Anatomy and Surgery in the University of Pennsylvania; Surgeon to the Dispensaries of the Presbyterian, Methodist, Episcopal, and Children's Hospitals.

1866. Tyson, James, M.D., Professor of Clinical Medicine in the University of Pennsylvania; Physician to the University Hospital; Visiting Physician to the Philadelphia Hospital.

1864. Vandyke, E. B., M.D.

1873. Van Harlingen, Arthur, M.D., Emeritus Professor of Diseases of the Skin in the Philadelphia Polyclinic; Dermatologist to the Howard Hospital.

ELECTED

1893. Vansant, Eugene Larue, M.D., Lecturer on Clinical Medicine in Jefferson Medical College; Visiting Physician to the Philadelphia Hospital.

1883. Vinton, Charles Harrod, M.D.

1885. Walker, James B., M.D., Attending Physician to the Philadelphia Hospital; Lecturer on Clinical Medicine and Consulting Physician to the Woman's Hospital.

1893. Warren, Joseph W., M.D., Associate Professor of Physiology in Bryn Mawr College.

1895. Watson, Arthur W., M.D.

1886. Watson, E. W., M.D., Physician to the Pennsylvania Institution for the Blind; Visiting Physician to the Home for Consumptives.

1875. Webb, William H., M.D.

1883. Welch, William M., M.D., Physician-in-Charge of the Municipal Hospital for Contagious Diseases; Consulting Physician to the Northern Dispensary; Consulting Physician to the Northern Home for Friendless Children.

1893. Westcott, Thompson S., M.D., Visiting Physician to the Methodist Episcopal Hospital; Physician to Outpatient Department, Children's Hospital.

1884. Wharton, Henry R., M.D., Demonstrator of Surgery in the University of Pennsylvania, and Assistant Surgeon to the Hospital of the University of Pennsylvania; Surgeon to the Children's, Presbyterian, and Methodist Episcopal Hospitals.

1883. Whelen, Alfred, M.D.

1878. White, J. William, M.D., Professor of Clinical Surgery in the University of Pennsylvania; Surgeon to the Maternity Hospital.

†1880. Willard, De Forest, M.D., Clinical Professor of Orthopædic Surgery in the University of Pennsylvania; Surgeon to the Presbyterian Hospital; Consulting Surgeon to the White and to the Colored Cripples' Homes and to the Home for Incurables.

ELECTED

*1878. Williamson, Jesse, M.D., Visiting Surgeon, St. Francis Hospital, Colorado Springs, Colorado.

1881. Wilson, H. Augustus, M.D., Professor of General and Orthopædic Surgery in the Philadelphia Polyclinic; Clinical Professor of Orthopædic Surgery in the Jefferson Medical College; Consulting Orthopædic Surgeon to the Philadelphia Lying-in Charity and to the Kensington Hospital for Women.

1874. Wilson, James C., M.D., Professor of the Practice of Medicine and of Clinical Medicine in Jefferson Medical College, and Physician to the Hospital of the same (Faculty Staff); Physician to the German Hospital; Attending Physician, Pennsylvania Hospital; President of the Philadelphia County Medical Society.

†1884. Wirgman, Charles, M.D., Physician to the Hospital of Jefferson Medical College and to the Howard Hospital; Physician to Out-patient Department of Children's Hospital.

1852. Wister, Owen Jesse, M.D., Consulting Physician to the Jewish Hospital.

1893. Wolff, Lawrence, M.D., Demonstrator of Chemistry in the Jefferson Medical College; Visiting Physician to the German Hospital; Clinical Professor of Medicine in the Woman's Medical College.

1893. Wood, Alfred C., M.D, Assistant Surgeon to Gynecean Hospital; Instructor in Clinical Surgery in the University of Pennsylvania; Assistant Surgeon to the University Hospital; Surgeon to Out-patient Department of the University Hospital; Surgeon to the Philadelphia Hospital.

1865. Wood, Horatio C., M.D., Professor of Materia Medica, Pharmacy, and General Therapeutics in the University of Pennsylvania, and Clinical Professor of Diseases of the Nervous System in the Hospital of the same.

1880. Woodbury, Frank, M.D., Honorary Professor of Clinical Medicine in the Medico-Chirurgical College, and Physician to the Hospital of the same.

ELECTED

1866. Woods, D. F., M.D., Physician to the Presbyterian Hospital.

1888. Woodward, Charles E., M.D., Physician to the Chester County Prison and West Chester Board of Health; U. S. Examining Surgeon.

1878. Wormley, Theodore G., M.D., LL.D., Professor of Chemistry in the University of Pennsylvania.

1860. Wurts, Charles Stewart, M.D., Physician to Foster Home.

1868. Yarrow, Thomas J., M.D.

1889. Young, James K., M.D., Instructor in Orthopædic Surgery, University of Pennsylvania, and Chief Attending Surgeon in the Orthopædic Department of the Hospital; Professor of Orthopædic Surgery, Philadelphia Polyclinic; Clinical Professor of Orthopædic Surgery in the Woman's Medical College of Pennsylvania; Surgeon to the Home for Crippled Children.

1894. Zentmayer, William, M.D., Assistant Surgeon to Wills Eye Hospital; Ophthalmologist to St. Mary's Hospital, Philadelphia, and to the Stratford Castle Hospital, Phœnixville, Pa.

1887. Ziegler, Walter M. L., M.D., Assistant Aural Surgeon and Chief of the Dispensary for Diseases of the Ear in the Hospital of the University of Pennsylvania.

1895. Zimmerman, Mason W., M.D., Ophthalmic Surgeon to the Germantown Hospital.

ASSOCIATE FELLOWS.

[Limited to Fifty, of whom Twenty may be Foreigners.]

ELECTED

1873. Acland, Henry W., M.D., F.R.S., Oxford, England.
1890. Baccelli, Guido, Rome, Italy.
1877. Barnes, Robert, M.D., London, England.
1876. Billings, John S., M.D., U. S. A., Washington, D. C.
1886. Bowditch, Henry P., M.D., Boston, Massachusetts.
1894. Brunton, T. Lauder, M.D., London, England.
1877. Chaillé, Stanford E., M.D., New Orleans, Louisiana.
1886. Cheever, David W., M.D., Boston, Massachusetts.
1876. Comegys, C. G., M.D., Cincinnati, Ohio.
1876. Corson, Hiram, M.D., Norristown, Pa.
1893. Councilman, William T., M.D., Boston, Massachusetts.
1876. Davis, N. S., M.D., Chicago, Illinois.
1886. Draper, William H., M.D., New York.
1892. Emmet, Thomas Addis, M.D., New York.
1883. Fayrer, Sir Joseph, M.D., LL.D., F.R.S., London, England.
1892. Fitz, Reginald H., M.D., Boston, Massachusetts.
1896. Fletcher, Robert, M.D., Washington, D. C.
1876. Green, Traill, M.D., Easton, Pennsylvania.
1883. Heath, Christopher, F.R.C.S., London, England.
1874. Jackson, J. Hughlings, M.D., London, England.
1891. Jacobi, A., M.D., New York.
1893. v. Jaksch, Rudolf, M.D., Prague, Bohemia.
1876. Johnson, Sir George, M.D., F.R.S., London, England.
1876. Jones, Joseph, M.D., New Orleans, Louisiana.
1893. Kerr, John G., M.D., Canton, China.
1877. Lister, Sir Joseph, Bart., M.D., LL.D., F.R.S., London, England.

ELECTED

1895. McBurney, Charles, M.D., New York.
1886. McGuire, Hunter, M.D., Richmond, Virginia.
1876. Moore, E. M., M.D., Rochester, New York.
1873. Ogle, John W., M.D., London, England.
1874. Paget, Sir James, Bart., M.D., LL.D., F.R.S., D.C.L., London, England.
1876. Pollock, A. M., M.D., Pittsburg, Pennsylvania.
1876. Porcher, F. Peyre, M.D., Charleston, South Carolina.
1886. Reeve, John C., M.D., Dayton, Ohio.
1886. Senn, Nicholas, M.D., Milwaukee, Wisconsin.
1886. Thomas, T. Gaillard, M.D., New York.
1869. Valcourt, Th. de, M.D., Cannes, France.
1892. Virchow, Rudolf, M.D., Berlin, Germany.
1894. Warren, J. Collins, M.D., Boston, Massachusetts.
1894. Weir, Robert F., M.D., New York.
1892. Welch, William H., M.D., Baltimore, Maryland.
1886. Whittaker, James T., M.D., Cincinnati, Ohio.
1886. Yandell, David W., M.D., Louisville, Kentucky.

CORRESPONDING MEMBERS.

ELECTED

1880. Carrow, Flemming, M.D., United States.
1880. Chiara, Domenico, M.D., Florence, Italy.
1886. Dey, Kanny Lall, M.D., Calcutta, India.
1885. Rendu, Jean, M.D., Lyons, France.
1889. Strahan, John, M.D., Belfast, Ireland.

NECROLOGICAL LIST

FELLOWS

CHARLES STEWART BOKER	Dec. 30, 1894
GEORGE REX	Feb. 4, 1895
ROBERT RANDOLPH TAYLOR	Feb. 26, 1895
W. S. W. RUSCHENBERGER	March 24, 1895
LEWIS D. HARLOW	June 23, 1895

ASSOCIATE FELLOW

R. B. MOWRY	March 14, 1895

CONTENTS.

	PAGE
List of Officers and Standing Committees	v
List of Presidents of the College	vii
List of Fellows of the College	ix
List of Associate Fellows of the College	xxxiii
List of Corresponding Members	xxxiv
Necrological List for 1895	xxxv
Memoir of William V. Keating, M.D.	xxxix
Memoir of Robert R. Taylor, M.D.	xliii
Annual Address of the President	xlvii

Muscular Atrophy and Peripheral Nerve-changes following Typhoid Fever. By James Hendrie Lloyd, A.M., M.D. 1

Remarks on the Hygiene of Children—Feeding, Shoes, Measurement of Length. By J. P. Crozer Griffith, M.D. 8

A Case of Hypospadias with Hermaphroditic Appearance. By Guy Hinsdale, M.D. 18

Eczema of Mucous Membranes. By M. B. Hartzell, M.D. 20

Tetanus Cephalic. General Tetanus Associated with Hemifacial Paralysis. Recovery. By De Forest Willard, M.D., assisted by James I. Johnston, M.D. 27

Double Hemiplegia with Double Hemianopsia and Loss of Geographical Centre. By Thomas D. Dunn, M.D. 45

A Case of Acute Œdema of the Larynx in which Recovery followed Tracheotomy. By H. R. Wharton, M.D. 57

Synopsis of a Paper on a Clinical Study of Cases of Persistent Absence of the Gastric Secretory Function. By D. D. Stewart, M.D. 62

A Case of Ruptured Uterus, with Operation and Recovery. By Isaac Massey, M.D. 69

PAGE

Ovariectomy in Shanghai, China; Tumor 182½ Pounds. By Robert P. Harris, M.D. 71

Rupture of the Long Tendon of the Biceps Brachii Muscle Associated with Rheumatoid Arthritis. By Gwilym G. Davis, M.D., M.R.C.S. 73

The Development of Bloodvessels in New Tissues Resulting from Diseased Growth, and in Tissues Naturally Avascular. By Arthur V. Meigs, M.D. 81

Remarks on Hydrophobia. By Charles W. Dulles, M.D. . 84

Presentation of a New Instrument for Pneumotherapy, with Exhibition of a Patient 87

A Case of Secondary Carcinoma of the Bones. Multiple Fracture; Associated Duodenal Ulcer; Polyuria. By J. H. Musser, M.D. 90

A Case of Dermoid Tumor of Both Ovaries Complicated by a Deposit of Bone Upon Each Side of the True Pelvis, Having No Connection with the Tumors. By Charles P. Noble, M.D., and Joseph P. Tunis, M.D. . . 100

A Consideration of Some of the Newer Problems in Abdominal and Pelvic Surgery in Women. By Charles P. Noble, M.D. 108

On Treatment of the Sac in Operations for the Radical Cure of Hernia. By Gwilym G. Davis, M.D., M.R.C.S. (Eng.) 130

Some Salient Points in the Diagnosis, Pathology, and Treatment of Appendicitis. By John B. Deaver, M.D. . . 138

Appendix.—Additions to the Mütter Museum 155

Abstract of the Report of the Library Committee . . 158

List of Papers: Section on Ophthalmology . . . 159

List of Papers: Section on Otology and Laryngology . 162

List of Papers: Section on Gynecology 164

List of Papers: Section on General Surgery . . . 166

MEMOIR OF WILLIAM V. KEATING, M.D.

By JOHN H. PACKARD, M.D.

[Read April 3, 1895.]

In accordance with a time-honored and most fitting custom of the College, the duty has been assigned me of preparing a biographical notice of a man who was in his early prime one of its most active Fellows—one whose many estimable qualities endeared him to those who were privileged to know him, and whose abilities were such as to fit him for a foremost place in the ranks of the profession which he loved and honored. For many years he lived a life of comparative retirement, so that perhaps he is hardly known even by name to most of those who now carry on the affairs of the College. Yet it is eminently proper that a memorial of him should be put upon record, and that, although he has passed over to the majority, his virtues should be still kept in kindly remembrance.

William Valentine Keating was born in Manayunk, then an outlying suburb of Philadelphia, on the 24th of April, 1823. He came of a good stock. Both of his grandfathers, who were brothers, were officers in an Irish brigade in the French Army; being ardent royalists, they resigned their commissions in 1792, on the outbreak of the Revolution. One of them, William by name, married and settled on the Island of Mauritius; the other, John, emigrated to America, living first in Wilmington, Del., and later moving to Philadelphia, where he became identified with many of the institutions of the city, notably with the University of Pennsylvania, the Philadelphia Saving Fund, and some of the important charities. He died at the age of ninety-six. Of his three children one, John Julius, studied

law, and had already attained distinction at the bar when he was cut off by death in his twenty-fifth year. He married Elizabeth Hopkinson, a granddaughter of the signer of the Declaration of Independence. The other son, William Hypolitus, devoted himself to science. He was Professor of Chemistry and Mineralogy in the University of Pennsylvania from 1822 to 1827, one of the founders of the Franklin Institute, and active in the early affairs of the Reading Railroad. He was best known, however, as the mineralogist and historian of Long's second expedition to the far West in 1823.

The daughter, Eulalia, became the wife of her cousin Jerome, whose father had sent him to be educated in Philadelphia under the care of his uncle.

Jerome Keating was extensively engaged in the China trade and in manufacturing concerns, having become a member of the house of Borie, Laguerenne & Co. He lived near the mills conducted by the firm in Manayunk, and here the subject of this memoir was born and spent his first ten years. Then the father died, and the widow with her son removed to Philadelphia.

William's chief mental training was received at St. Mary's College, Baltimore—a Roman Catholic institution which has since been withdrawn from the field of secular teaching. Here he acquired a thorough education; his knowledge of the classics was a source of pleasure to him throughout his subsequent life. He was graduated at the head of his class in 1840, but with his health so broken that it was thought necessary for him to spend a year in Cuba. On his return he began the study of medicine at the University of Pennsylvania, under the preceptorship of Dr. Charles D. Meigs. He took his degree as Doctor of Medicine in 1844, his thesis being on the subject of "Typhoid Fever." Among his fellow-graduates were Joseph Leidy, Joseph Parrish (the second), Moreton Stillé, Bernard Henry, J. H. B. McClellan, and Edward R. Mayer; all these, who have passed away, became Fellows of the College. Another name on the list is that of Dr. Robert P. Harris, who is still with us. Dr. John Curwen, the distinguished alienist, was also a member of the class.

Dr. Keating served a term as resident physician at the Blockley Almshouse (now known as the Philadelphia Hospital), and then began practice in the city, giving special attention to obstetrics, in which branch he was very successful. He also took a lectureship on this subject in the summer school of that day—the Philadelphia Association for Medical Instruction. In this connection, which continued for over ten years, he gained high repute as a teacher. He had a clear and forcible style, a pleasing manner, and a voice at once sonorous and agreeable. His general practice became very extensive. He was a member of the first staff appointed at the newly organized St. Joseph's Hospital in 1844, and was attending physician to St. Joseph's Orphan Asylum. He edited an edition of Ramsbotham's *Principles and Practice of Obstetric Medicine and Surgery*, and contributed valuable papers to the medical periodicals.

In 1860 Prof. Charles D. Meigs resigned the Chair of Obstetrics in the Jefferson Medical College, and Dr. Keating was elected to the vacant place; but before he had entered upon his duties his health failed, and in the spring of 1861 he went to Europe. He had with him the manuscript of a book written by himself for publication, intending to revise it; this was in a trunk which was stolen from the railway station in Paris, and the work of years was irretrievably lost. Another misfortune —the mistake of a druggist in giving him a poison instead of a simple remedy—nearly cost him his life, and so discouraged him in his already impaired state of health that he felt constrained to give up his newly gained professorship. A further stay of eighteen months, however, had a beneficial effect, and in 1863 he returned home, assuming duties in connection with army hospitals in Philadelphia. He also resumed private practice, but never very actively, and in 1887 he made another trip abroad, remaining more than a year. After this he devoted himself mainly to charitable work, acting as medical director of the three large hospitals carried on in this city under the auspices of the Roman Catholic Church.

The death of his eldest son, Dr. John M. Keating, which took place in November, 1893, was a very severe blow to him, but

he bore with manly fortitude the extinction of what had been highly cherished hopes, and patiently went on with his work. On April 18, 1894, he gave a lecture on nursing to the novices at St. Joseph's Hospital. Just as he pronounced his closing words he was seized with cardiac oppression, and died almost immediately. By a singular coincidence it was the fiftieth anniversary of his appointment to office in the staff of the institution.

Dr. Keating became a Fellow of the College in July, 1849. He was also a member of the American Medical Association, of the Philadelphia County Medical Society, of the American Philosophical Society, of the Academy of Natural Sciences, and of other learned bodies. He was for thirty-eight years a Director of the Philadelphia Saving Fund, both his father and his grandfather having preceded him in that capacity.

Dr. Keating was twice married. His first wife, by whom he had four children who lived to maturity, was the daughter of the distinguished Dr. René La Roche, whose work on *Yellow Fever* has taken a classical rank. She died in 1859. The second union, contracted in 1861, was with Eliza, daughter of John J. Boric, one of Philadelphia's old-time merchants. She bore him three children, two of whom are still living. She died in 1866.

From his education and social position, and from his extensive acquaintance with people in all walks of life, Dr. Keating possessed an unusual knowledge of the ways of the world, and a ready tact which commended him even to strangers. He held decided opinions; in religion he was a devout member of the Roman Catholic Church, and a faithful attendant upon its services. He was a man of wide reading and varied accomplishments, an excellent linguist, and a most entertaining companion. With his professional associates he was uniformly courteous and considerate. He had in the sick-room a calm and composed, yet sympathetic manner, which inspired the confidence and won the affection of his patients. He was an intelligent practitioner, with great therapeutic resources; and only his physical disabilities prevented him from leaving an enduring impress upon the medical history of his time.

MEMOIR OF ROBERT R. TAYLOR, M.D.

By RICHARD A. CLEEMANN, M.D.

[Read October 2, 1895.]

It is my privilege to-night to read a memoir of an old friend, and one who has been for nearly thirty years a Fellow of this College.

Robert Randolph Taylor, the son of Lewis Walker Taylor and Elizabeth Wormely Berkeley, his wife, was born in Virginia, February 14, 1826. His parents were both of English descent, of the good stock that made Virginia prominent and prosperous in Colonial days, his ancestors being among the earliest settlers and largest land-holders of the Old Dominion. He first saw the light at Edgewood, the plantation of his grandfather, Dr. Carter Berkeley, in Hanover County, by whom he was brought up, his father having died while he was still an infant. In these rural surroundings he passed his early life and in due time entered the University of Virginia, from which he was graduated June 29, 1847, at the age of twenty-one years.

Having chosen the profession to which his grandfather belonged, he came to Philadelphia and became a student in the Medical Department of the University of Pennsylvania, from which institution he received the degree of Doctor of Medicine, April 7, 1849.

Dr. Taylor began the practice of medicine in his native State, settling in Goochland County, and remained there eight years. From here he removed, on account of the ill health of his sister, who needed a more invigorating climate, to Cedar

Rapids, Iowa, at that time an outpost in the far West. It was not long before he became one of the prominent practitioners of medicine in this region, and here he was in active practice when, the country becoming overwhelmed with the Civil War, he forsook civil life and joined as Medical Officer a regiment of volunteers which was raised in the State where he had cast his lot. Dr. Taylor served four years in the army, commissioned first as Lieutenant and Assistant Surgeon, and mustered out with the rank of Major and Brevet Lieutenant-Colonel "for faithful and meritorious service." I quote regarding his military career from Circular No. 15, Series of 1895, of the Military Order of the Loyal Legion of the United States, Headquarters Commandery of the State of Pennsylvania.

"He entered the army as Assistant Surgeon 4th Iowa Cavalry and served under General Curtis during the Missouri campaign in 1862. His health having been impaired by exposure and arduous duties in the field, he was ordered to the U. S. General Hospital at Hestonville, and was commissioned Assistant Surgeon U. S. Volunteers, November 7, 1862. Promoted to Surgeon U. S. Volunteers in 1863, he was assigned as Surgeon-in-charge of the Catharine Street U. S. General Hospital, which he organized and placed in successful operation, receiving the cordial approbation of the Medical Director and gaining a reputation as an executive officer of marked ability.

"In the spring of 1863 General Rosecrans, in command of the Army of the Cumberland, complained to the War Department of the inferior quality of his medical officers. In response to this Surgeon Taylor was, among others, sent West to reorganize and reform the military hospitals in Nashville. In this capacity he displayed great energy, and soon became known as a faithful and indefatigable worker. His hospitals soon attained the highest degree for order and usefulness. His skill as a military surgeon and his ability as an organizer, joined with a tender solicitude for the sick and wounded in his charge, made him an ideal medical officer.

"When in June, 1865, Surgeon Caleb W. Horner was assigned to the staff of General O. O. Howard as Chief Medical Officer

of the Bureau of Refugees and Freedmen, the Department gave him permission to select from the experienced medical officers yet in the service one for the staff of each Assistant Commissioner stationed at the Capital of each Southern State, he selected Surgeon Taylor for Arkansas, to which Missouri was later added, and he was ordered to report to General Sprague as Surgeon-in-Chief of that department. He performed his new duties with zeal and success until March, 1866, when he resigned at Little Rock, Arkansas. Soon after he was mustered out of the service.

"Surgeon C. W. Horner, the Chief Medical Officer of the Freedmen's Bureau, referring to his services in that department, says: 'As a disciplinarian, as a surgeon, and as an administrative officer, Surgeon Taylor was held in high repute by the military authorities.'"

On leaving the army Dr. Taylor did not return to Iowa. He had married, in 1853, Miss Helen Bonsall, daughter of John Bonsall, Esq., of Philadelphia; he had never entirely lost the associations he had made when a student here, some of which had been renewed during his military service, and he determined to make the birthplace of his wife his home.

After practising his profession for a short time in the adjacent town of Media, he settled permanently in Philadelphia, residing for a time in the house occupied for many years by Dr. Paul B. Goddard, a distinguished Fellow of this College, his brother-in-law, who had recently died. Here, then, in Philadelphia the greater part of his professional life was passed, nearly thirty years, though toward the end he had gradually dropped out of active work. His practice was not, however, the absorbing occupation of all his working-hours, as is the lot of many hard-worked city physicians. The condition of his health would not have permitted this. He suffered from early manhood from occasional hemorrhages of the lungs, which were supposed at one time to indicate serious pulmonary disease, and he presented in later life alarming signs of heart-lesions. For some years, from 1883 to 1893, he was the Resident Physician to the large hotel at Capon Springs,

Virginia, during the summer months, a temporary change of residence which was exceedingly beneficial to his health and enabled him to reach a limit of life much beyond what was at one time expected. The last years of his life were clouded by sorrow. In May, 1894, his faithful wife, a most lovely character, died after a long and painful illness, during which he watched over and tended her with the most assiduous and pathetic devotion. He followed her to the grave a few months afterward, February 26, 1895, just after having passed his sixty-ninth birthday. He had been suffering for a few days with an internal otitis, and died rather suddenly with symptoms of cerebral hemorrhage.

Dr. Taylor was a faithful, conscientious, and conservative physician. He kept himself well informed in the current literature of his profession, though he has left behind him no contributions from his own pen. He was ever ready to accept new methods of treatment, but, relying on his own observation and judgment, he did not mistake every vaunted change of practice, sanctioned by however high an authority, as real progress.

Notwithstanding his frequent attacks of sickness Dr. Taylor was a man of fine and commanding appearance; he was considerably more than six feet in height, of a large though spare frame, and a very erect carriage; his features were regular and adorned with a full beard, which was dark in color in his earlier years. In manner he was frank and exceedingly cordial; he was very social, a good talker, losing little of the gayety of youth with his advancing years and retaining his popularity among the younger men, in whose pleasures he was ever ready to engage. His home was a very happy one; he had five sons, four of whom are living, having reached man's estate; the first and third sons, John Bonsall and Carter Berkeley, are well-known members of the Philadelphia Bar, while the second and the youngest, Robert Randolph and Edmund Carter, are engaged in mercantile pursuits.

ANNUAL ADDRESS OF THE PRESIDENT.

By J. M. DaCOSTA, M.D.

[Read December 4, 1895.]

At this meeting the law of the College makes it incumbent on the President to address it on its affairs. The task is both pleasant and easy; for the College is, on the whole, in a prosperous and progressing condition. Yet there are some matters to which attention may be advantageously drawn.

During the term of our late President, to whose devotion and thoughtful generosity this College must be forever indebted, one of the most important movements in its history was inaugurated by the creation of Sections. Enough time has now elapsed for us to appreciate their working and to form an idea of their future advisability. That they have worked well is undoubted. They have stimulated to greater activity, and valuable papers, which never would have been written, have been forthcoming under their fostering influence. The fear that the communications at the general meetings would be lessened has proved unfounded. There have been quite as many of these as usual, and of not inferior interest. It would not, indeed, have been possible to read, far less to discuss, at the general meetings more than a fraction of the papers that have been presented at the Sections. To the Surgical Section alone, in five months, twenty-five written communications have been made, besides verbal ones; to the Gynecological, in seven meetings, over twenty, in addition to the presentation of many pathological specimens. In the Ophthalmological Section, in little over two years, seventeen meetings have been held, in

which thirty-three papers were read, and fifty cases, nineteen specimens, and eighteen instruments shown; and the record of the other sections is also that of energetic labor.

It is much to be regretted that all this work is done without being utilized to the full and published by the College. The Sections and the whole College would alike thus benefit, and a much fairer idea would be afforded of the scientific activity of the College than our slim yearly volume of TRANSACTIONS gives. The best way, undoubtedly, would be to print from all Sections, in our annual volume, such papers as the Committee of Publication of the College accepts. Our funds, unfortunately, do not justify this costly method. As the matter seemed to me one of great importance, I held a conference with the Chairmen of the Sections, to ascertain the different modes of publication, and to discuss the practicability of a uniform system. The outcome of comparison of views makes me regard the plan followed by the Gynecological Section as, at present, the most feasible. It consists in the Section giving its papers to one journal, receiving extra copies, some of which go to the College library, and in collecting the printed matter into a volume. This could be paged separately, a title page and table of contents struck, and the Sections authorized to put the College seal on the title-page, in a manner similar to that in our TRANSACTIONS. I ask permission for the Sections to do this; the work is then stamped as that of the Fellows of our College, as it ought to be.

There are now in operation four Sections: An Ophthalmological, a Gynecological, one on General Surgery, one on Otology and Laryngology. The oldest of these is the Section on Ophthalmology, which was authorized by the College in April, 1893. The Section on Orthopedic Surgery has concluded that it can most usefully labor by uniting with the Section on General Surgery, subsequently organized. A Section on Medicine has been much spoken of, but no formal application has been made for its establishment.

The Sections are all acting under a resolution of the College binding for three years. As this time will expire in April, and

as experience has shown that there are many questions arising that can best be settled by adopting some general laws bearing alike on all, I recommend that a committee be appointed, consisting of the Chairmen of the Sections, an equal number of Fellows of the College not members of Sections, the Secretary and the President of the College, to report, if possible, such laws at the March meeting of the College. The report, if adopted, can govern the Sections either in the shape of a resolution or as an addition to our By-laws, as the College may then determine.

All the committees have worked with zeal and well-directed aim. Our home is in a good state, and the Hall Committee has been active, with the most satisfactory results. Electric light has been generally installed, and its introduction into the library is of special value. The new metal ceiling of the museum is a complete success. It prevents excessive heat of the room in summer, and, in more than one way, remedies long-standing discomfort and annoyance.

The two great collections our building contains—the library and the museum—are constantly growing. The library numbers nearly fifty thousand books and thirty thousand pamphlets; it has been this year, as before, enriched by the gifts of Fellows of the College, as well as of some who are not Fellows. Its income does not enable it to do all it would like to do, especially as some of the funds cannot be used for the heavy general expenses. The proceeds it derives from the Nurses' Directory, unfortunately, have steadily diminished during the last three years. Under present circumstances, the policy of the library will have to be to limit itself to the keeping up and completing its list of journals, and to buying new books, from the special funds for the purpose; it must trust to individual Fellows for other acquisitions. Just now the crying need is for increased space; the library is overcrowded. A second tier of bookstacks would remedy this, and the matter is recommended strongly to the interest and generosity of the Fellows.

There have been considerable additions to the museum during the year, and it has been more generally used. The

Committee has under consideration plans to favor its further usefulness, and to make it an aid in original research. In connection with the museum, a collection of instruments has been founded, that must grow largely, if the Fellows will bear it in mind and contribute according to their opportunities. In time it cannot fail to become of much historical value. Dr. John B. Roberts has generously presented an important set of surgical instruments; Dr. Meigs one chiefly of obstetrical and gynecological kind, doubly valuable as having belonged to his distinguished medical ancestors; and it has been my pleasure to give a collection of medical instruments.

The Committee on the Directory for Nurses has made several excellent suggestions that, it is hoped, will be acted on. The Directory has been not only of the greatest use to the community, but of the greatest use in contributing to the building up of the library of the College; and in helping it actively, every Fellow is at the same time helping the College.

Moneys have accumulated from the Weir Mitchell entertainment fund sufficient to carry out to the full the intention for which it was founded. The Committee has determined, therefore, to give, early in the coming year, an entertainment in the College building that, judging by the past, cannot fail to be a most pleasant occasion.

Our Ordinances and By-laws ought, I think, to be re-edited and reissued. They were printed last in 1886, and many additions and changes have been made since. If the College direct the reissue, it would be a good opportunity to correct also some inaccuracies, and I suggest that the Council be asked to report to the College what alterations are desirable.

Our Secretary has announced that he will not be able to continue his work. The College recognizes the validity of his reasons, but it must long regret the loss of his services. We all know him to be a model officer in efficiency, and of energy absolutely contagious. In the history of this College the name of Charles Winslow Dulles will shine conspicuously.

The two prizes in the gift of the College have been awarded by the Committees after most careful and laborious inquiry.

The William F. Jenks Memorial Prize was given to Dr. Abram Brothers, of New York, for an essay on the "Infant Mortality in Labor and Its Prevention." The Alvarenga Prize goes to our Curator, Dr. Guy Hinsdale, for a dissertation on "Syringomyelia."

The attendance at the general meetings of the College has been fairly good, an average of fifty-five members being present. To insure larger meetings and the fullest interest, some evenings might be devoted to the discussion of topics in which the different Sections can come together on common ground. Such a discussion is being arranged for February.

The College has now on its roll 295 Fellows, 43 Associates, and 6 Corresponding Members. We could, I believe, strengthen it by filling up our list of Associates and by increasing our Corresponding Members, the greatest care being taken in the selection. There is no one who would not regard it as an honor to be chosen by the oldest medical society in America; at the same time, the choice would show our keen sympathy with the active workers of the day. As regards Associates, the number of which is a limited one, it might be well for the Council to keep a list of men of note from which to recommend selection as vacancies occur.

We have to deplore the loss during the year, by death, of five Fellows and one Associate Fellow: Ruschenberger, Boker, Rex, Taylor, Harlow, and Mowry. Full and appreciative notices of Ruschenberger have been presented to the College; but it is fitting that we should here once more speak of the upright, self-contained man, who during long years gave so much of his time to the institution that had elected him its President. Of Taylor, we remember his agreeable personality, his sense of duty, and his fine record as a surgeon in the field. Boker was rarely with us; poor health prevented it; but those of us who knew him, knew also that poor health alone prevented him from becoming a distinguished surgeon. He was, in early life, pre-eminent for coolness and sound judgment. In George Rex we lost the genial, hard-working physician, whose very large practice did not hinder him from keeping

himself thoroughly informed regarding the advances of scientific medicine. For Harlow, everyone who was much thrown with him had affection. How he will be missed at many a bedside; this conscientious, devoted physician, this unobtrusive true man and faultless gentleman! Of Mowry, our Associate, we know how prominent and universally respected he was where he lived.

Fellows of the College, we are about entering on a new year of our labors. Let us all work together for the good and the increased usefulness of this venerable institution. Let us bear in mind the spirit in which its founders conceived it, and carry on its mission in accordance with its honorable origin, its time-attested fame, its cherished traditions.

MUSCULAR ATROPHY AND PERIPHERAL NERVE-CHANGES FOLLOWING TYPHOID FEVER.[1]

By JAMES HENDRIE LLOYD, A.M., M.D.,
PHYSICIAN TO THE PHILADELPHIA HOSPITAL, TO THE METHODIST EPISCOPAL HOSPITAL, AND TO THE HOME FOR CRIPPLED CHILDREN.

[Read January 2, 1895.]

The object of this brief communication is to put on record the history of a rather anomalous case and to exhibit photographs of the patient. Multiple neuritis has been recognized for some years as a possible complication or sequela of typhoid fever. Without reviewing the literature, which is already quite extensive, it is sufficient to say that this recognition is strictly contemporaneous with that universal recognition of multiple neuritis which, during the last two decades, has resulted in placing that affection among the most common of nervous diseases. Among the well-known causes of multiple neuritis are various infectious diseases; yet these vary greatly in their proneness to involve the peripheral nerves. The most common is undoubtedly diphtheria, which causes a distinct type of polyneuritis. Typhoid fever is probably the next in order. The various paralyses following enteric fever were observed, of course, long before their true nature was recognized; but they were almost universally ascribed to involvement of the spinal cord.

If it were merely, therefore, for the sake of describing one more case of this easily recognized complication, it might not be worth while to devote a paper specially to it. It is rather for the purpose of discussing briefly some yet uncertain points

[1] For the use of the cuts illustrating this article we are indebted to the University Medical Magazine.—Ed.

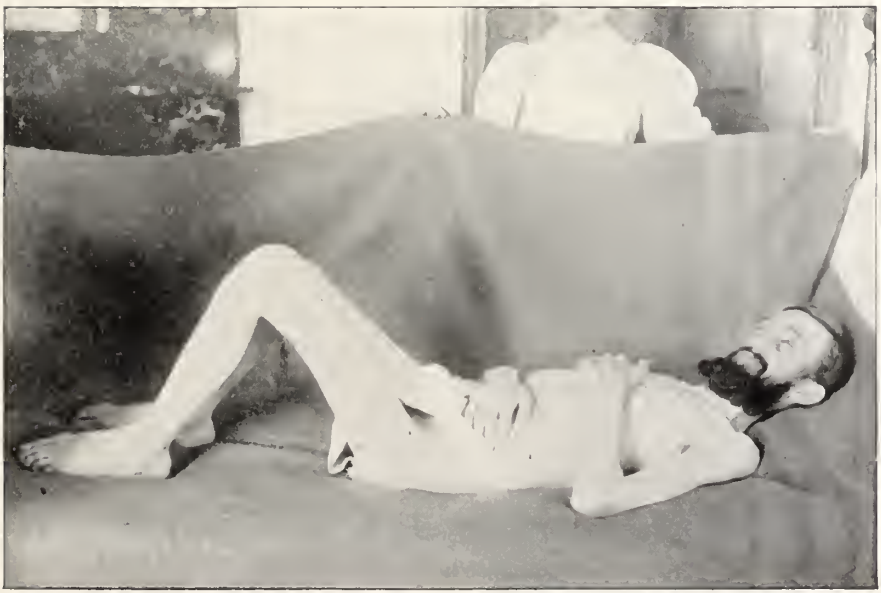
in the pathology of the nervous sequelæ of typhoid fever that I have made this case a text. It does not seem to me that all these cases are necessarily cases of pure and simple neuritis, and this one upon which I base this purely clinical discussion possibly was not.

The patient, a man, aged about thirty years, was admitted to the medical ward of the Methodist Hospital in July last. He was under the care of Dr. Westcott, who treated him successfully during a course of exceedingly grave typhoid fever, and to whom I am indebted for notes of the case. He passed into my care when I succeeded Dr. Westcott at the close of the latter's term, on November 1st, at which time he had just about reached the end of a second relapse, and was satisfactorily convalescent, with the exception of the nerve-involvement about to be noted. The distinctive features of the case were as follows: The patient's family history was negative; three sisters and two brothers are living and well, and present no trace of muscular atrophy. The patient had had the usual diseases of childhood, and when ten months old he is reported to have had an attack of meningitis. Whatever the cause, he has always been feeble-minded, presenting the grade of a high-type imbecile. The voluntary muscles, however, were not involved; the patient had always been able to walk, and had well-developed legs. In fact, he walked into the hospital when admitted. The diagnosis of typhoid fever was established by a prodromal stage of malaise, headache, anorexia, and diarrhœa; by the coated tongue with red tip and edges; and by the fact that when admitted he already had a tympanitic abdomen, increased splenic dulness, a slight cough, and the characteristic rose-colored eruption. His temperature, when admitted, was $104\frac{2}{5}°$ F.

The most salient features noted in the case need alone be discussed. The temperature pursued a course of unusual severity. As shown by the chart, it ranged at its highest for ten days at or above 104° F., only falling slightly at the morning remission or abruptly when brought down by the cold bath. On several occasions it rose to or above 105° F., and

Fig. 1.

Fig. 2.



A case of muscular atrophy following typhoid fever.

once to the extraordinary height, on the seventeenth day, of 106⅗° F. This was followed by an apparent crisis, during which, in less than twenty-four hours, the temperature fell to 97° F., almost ten degrees. This was evidently partly due to a plunge bath. The febrile course extended over a period of more than sixty days, in which time there were apparently two slight attempts at convalescence, followed by a relapse. It is possible that this extreme hyperpyrexia and this prolonged febrile course are significant in relation to the involvement of the muscles presently to be noted.

On the fifteenth day of the disease the patient had a convulsion. This unusual phenomenon in typhoid fever was without apparent cause in this case. There was no serious affection of the kidneys. The patient, although slightly feeble-minded, was not epileptic. The fit occurred shortly after his temperature had been reduced, for the first time, to the normal point by the cold baths with which he was treated. It is not likely that this treatment, or this reduction of temperature, could have produced an epileptoid seizure. It seems more probable that the patient, although not an epileptic, had an unstable brain-organization, as shown by his mild grade of feeble-mindedness, and that he thus succumbed in a convulsive paroxysm to the influence of the typhoid infection. Thus we know that children, with undeveloped brains and slight resisting power, not infrequently fall into convulsions at the onset of or during the course of the infectious diseases, especially scarlatina. There is probably some analogy to this tendency in children shown by our patient in his epileptoid seizure. This is not without significance, it seems to me, in its bearings upon the question of the involvement of this patient's neuromuscular apparatus. Both complications probably indicate a poorly developed nervous mechanism, which succumbed to the violence of the typhoid poison.

On the nineteenth day the patient had eleven hemorrhages from the bowels, in which he lost several pints of blood.

Later bedsores formed on the sacrum and elbows.

In connection with his paralysis it is interesting to note cer-

tain trophic lesions. A spot of dry gangrene the size of a dime formed on the left foot behind the external malleolus. On the right foot at the same place, a small ulcer appeared. These have been sluggish in character, and, although dressed carefully, are still, after four months, unhealed.

Before the paralytic symptoms were noted in the legs pain in these members was severe.

The paralysis began to be noted during convalescence, but it probably began when the patient was suffering with the pains in the legs as early as the sixth week. Painful contractures at the knee-joints began about the same time, and extension was applied.

At the end of the third month the right knee began to swell, and the right leg became œdematous; this was not caused by phlebitis. The swelling in the knee continues; the joint is not red nor hot, and is not painful except on motion. The affection has almost the appearance of a spinal arthropathy of mild type. The patient's convalescence has been tedious.

In the fourth month, when I took charge of him, his muscular atrophy was striking. His condition was as follows: Both legs were contractured at the knee, and very painful on any attempt at straightening them. The right knee was swollen, and the right leg œdematous. The peroneal muscles in both legs were markedly wasted, as were also the sural muscles. The wasting was worse on the left side. The quadriceps extensor muscle was involved, very markedly so on the left side. The extensor of the toes was not entirely paralyzed. The knee-jerk was almost abolished on the right; much diminished on the left. In the arms and hands power and nutrition were much better than in the legs. There was some wasting, however, of the thenar and hypothenar eminences. Sensation was good everywhere. No scoliosis had occurred. No fibrillation was observed.

The most wasted muscles—*i. e.*, in the sural and peroneal groups—did not respond to either the galvanic or faradic current. In less wasted—but still markedly wasted—muscles there was no serial nor qualitative change, although there was

decided quantitative change. A modal change was noted—*i. e.*, the muscles reacted sluggishly. Hence it cannot be said that there was a typical reaction of degeneration in these muscles, although there appears to have been a partial reaction of degeneration.

The last examination gave the following results:

Electrical examination was made with the galvanic current. Everywhere in both arms the anodal contraction was greater than the cathodal, and the reactions were practically normal. The calf of the right leg was greatly atrophied and very flabby, and there was a quantitative decrease in these muscles. The modal reaction is rather sluggish, but there is no qualitative change. CCc > ACc. In the extensor muscles there is great quantitative decrease, but no qualitative change. In the left thigh there is quantitative decrease, but no qualitative change in any of the muscular groups. There is great wasting in the peroneal and sural groups, and the knees are contractured. On the outer aspect of the left foot there are the remains of a bedsore, consisting of an open suppurating sore filling up with granulations, healthy in color. On the right hand there are several indolent sores, one especially over the first metacarpophalangeal joint, which feels rather thickened. There is now better use of the hands in extension and flexion than at the first examination (November 14th). There is marked atrophy of the thenar, hypothenar, and interosseous groups. There is no scoliosis. The tactile sense is good in all four extremities. There is no thermal anæsthesia except doubtfully on the dorsum of each foot, where the patient occasionally errs in his responses, but not always.

In considering the exact pathology of this case, without an opportunity for microscopic study, I was inclined at first to regard it simply as a neuritis of a type by no means unheard of after typhoid fever. It resembles clinically, in fact, the cases referred to by Sir James Paget,[1] in 1876, when he wrote of the peroneal and ulnar nerves as being especially liable to

[1] St. Bartholomew's Hospital Reports, 1876.

involvement after typhoid fever. A somewhat similar type—the so-called peroneal type of progressive muscular atrophy—was described by Tooth[1] and by Charcot and Marie[2] at about the same time. Tooth proposed the name "peroneal type" for a form of muscular atrophy which always begins in the peroneal group of muscles, and in which talipes equino-varus is gradually produced. The limbs are cold and livid. Cramps and pains (painful contractures) are seen. Fibrillary tremor may or may not occur, and the reactions of degeneration are present, as a rule. The arms and hands are involved later, the thenar, hypothenar, and interosseous groups being the first to go, the face being spared. Measles was suggested as a cause in one obscure case.

Charcot and Marie noted for this type that it always begins in the legs, predominating not rarely on one side; fibrillary contractions are clearly seen; the electrotonus is abolished absolutely in the wasted muscles, and the reactions of degeneration are present in those partially wasted. They claim that there is an absence of contractures at the joints. There are vasomotor changes. Sensibility was usually intact in their cases, and pains were present. They appear to recognize heredity alone as a cause.

Ormerod[3] reported three cases of this type of muscular atrophy in one family following measles. The affection invariably began in the legs below the knees, and then, after some months or even years, involved the hands and forearms, and always affected the distal more than the proximal portions of the limbs. Trophic lesions resembling chilblains were observed. Electrotonus was abolished below the knees, and partial reaction of degeneration was seen elsewhere. The knee-jerks were not abolished.

Autopsies made by Virchow, Oppenheimer, Friedreich, and others have disclosed in cases of this peroneal type an interstitial neuritis.

[1] Brain, vol. x. p. 252. [2] Rev. de Méd., Sixième Année, p. 97.
[3] Muscular Atrophy after Measles in Three Members of a Family. Brain, vol. vii. p. 334.

Ross[1] claims that the typhoid poison shows a special predilection for the peroneal and anterior tibial nerves.

An attentive study and comparison of my case with those of others, and comparison of these with one another, are not entirely convincing as to the identity of the pathological process in all cases. The peroneal type of muscular atrophy following measles or caused by heredity has been ascribed usually to a peripheral neuritis. The presence of fibrillation, the absence of anæsthesia, the preservation of the tendon reflexes, and the partial character of the electrical changes do not support the view satisfactorily that the peripheral nerves are always or alone at fault. It is possible that the muscular tissue itself may be at fault in some of these cases, as we know, from the researches of Zenker and others, that the voluntary muscles undergo grave changes in typhoid fever.[2] This possibility, I am convinced, has been too much overlooked in the discussion of these cases. In my own case, while an hereditary element cannot be traced, the personal antecedents of the patient were bad. He already was suffering from a badly developed nervous system, and this partial arrest of development may have served as well as an hereditary defect to precipitate rapid degeneration of nerve and muscular tissue under the evil influence of the typhoid poison. It may be, in fact, a question whether the process is entirely inflammatory as distinct from degenerative. Hoffmann, apparently with a kindred idea, proposes for such cases the name of progressive *neurotic* muscular atrophy. This is not a question of purely pathological interest; the prognosis is involved. The peroneal type of muscular atrophy, whatever its exact pathology, is an inveterate and progressive disease; whereas a simple multiple neuritis is a curable affection.

[1] Transactions of the Association of American Physicians, vol. iii.

[2] For a discussion of this subject see Luquet's Thesis, Des Altérations Musculaires se rattachant à la Fièvre Typhoïde. Paris, 1882.

REMARKS ON THE HYGIENE OF CHILDREN—FEEDING, SHOES, MEASUREMENT OF LENGTH.

By J. P. CROZER GRIFFITH, M.D.,
CLINICAL PROFESSOR OF DISEASES OF CHILDREN IN THE UNIVERSITY OF PENNSYLVANIA; PROFESSOR OF CLINICAL MEDICINE IN THE PHILADELPHIA POLYCLINIC.

[Read February 6, 1895.]

Although there are several matters connected with the hygiene of infancy to which I wish to refer, the principal one among them relates to the preparation of the infant's food, and, being chief, may be considered first.

It is admitted by nearly all writers that the object aimed at in the feeding of infants upon artificially prepared food should be to produce a milk which resembles human milk chemically, as far as it is possible to attain this end. With this in view, analyses of various milks have repeatedly been made in order to determine the relative proportions of the chief constituents —albuminoids, fat, sugar, water, and salts. Analyses of human milk are somewhat at variance. Those of Leeds would give the albuminoids as equalling 2 per cent. Those of Meigs, Harrington, and Biedert, on the other hand, place it at 1 per cent. Adopting the latter percentage as the result of the more recent investigations, and as sustained by the greater number of authorities, we may formulate the composition of woman's milk as follows (Rotch):

Reaction	Alkaline.
Bacteria	None.
Water	87–88 per cent.
Total solids	12–13 "
Fat	4 "
Albuminoids	1 "
Milk-sugar	7 "
Ash	0.2 "

While there are several species of animals whose milk may be used to replace human milk, none of them produces a secretion which is sufficiently like that of woman to permit of its use without previous preparation. Consequently, none of them presents any especial advantage over cow's milk, which certainly offers the most convenient basis upon which to construct an artificial human milk. The analysis of cow's milk, as ordinarily accepted, places its ingredients in about the following proportions (Rotch):

Reaction	Acid.
Bacteria	Present.
Water	86–87 per cent.
Total solids	13–14 "
Fat	4 "
Albuminoids	4 "
Milk-sugar	4.5 "
Ash	0.7 "

This applies, of course, to the average herd milk. Certain breeds of cows, and, still more, individual cows, give a milk which varies from the standard. It is the albuminoids of cow's milk, and especially the casein constituting the greatest proportion of these, which give the baby so much trouble to digest. There are undoubted chemical differences in the casein of the two sorts of milk, and these often cause difficulties which we are unable to overcome by any method of dilution or preparation. The mere matter of quantity of the different ingredients, however, we are able to manage. If we compare the two tables given, we notice that cow's milk, as contrasted with woman's milk, is much too rich in albuminoids, contains the same percentage of fat, has nearly twice as much sugar, and is slightly richer in ash. It is evident that by diluting cow's milk sufficiently we can reduce the albuminoids to the proper amount. It is also evident, however, that in so doing we diminish too greatly the amount of sugar and of fat. Our work, therefore, is clearly cut out for us, and consists in diluting cow's milk sufficiently to reduce the albuminoids to the proper percentage when the preparation is

completed, and then in adding cream and sugar in sufficient amount to make up for the loss of these ingredients.

As regards the sort of sugar to be used, milk-sugar is that naturally present in milk, and it certainly seems rational, therefore, to employ it. It is possible that cane-sugar may answer just as well; and, indeed, in the case of some children it seems to agree better; but these are only the exceptions. We should certainly try by the use of milk-sugar to approach as nearly as possible to the character of human milk.

With regard to cream, it is evident that its richness must determine the amount to be employed. Ordinary skimmed cream consists of 16 per cent. fat, while the thinner centrifugal cream contains about 20 per cent. In constructing any milk-mixture the character of the cream must be borne in mind, and the proportion varied accordingly. Finally, cow's milk, as it reaches the consumer, is very commonly acid and contains bacteria, while human milk is alkaline and is free, or practically free, from bacteria. The destruction of the bacteria is to be accomplished by sterilizing or some similar process. For the removal of the acidity the addition of lime-water is very commonly employed, but a solution of soda is greatly to be preferred for several reasons. There are several objections to lime-water, and it is on account of these that, with these introductory remarks, I wish to recommend the following formula, which gives a milk corresponding, as far as possible, to human milk:

MILK-MIXTURE.

Milk	1 ounce.
Cream (skimmed; 16 per cent. fat)	2 ounces.
or	
Cream (centrifugal; 20 per cent. fat)	1½ ounces.
Soda solution	½ ounce.
Milk-sugar	1 measure.
Water, enough to make	8 ounces.

This formula is a modification of one given by Dr. Rotch, which again was based upon one by Dr. Meigs; and that, I presume, a modification of previously existing ones. The Meigs mixture, as is well known, contains "sugar-water," a

solution of milk-sugar in water of a calculated strength. As the author himself admits, this solution has to be made fresh every few days, since it will not keep. To obviate this difficulty Dr. Rotch used a little measure, and measured out the amount of sugar—three and three-eighths drachms—required for each eight ounces of milk-mixture. Mr. Andrew Blair, apothecary, of this city, has made for me a similar measure, which I exhibit this evening. It differs somewhat from that of Dr. Rotch in shape, but holds the same amount. Its cost is nominal, and it is very convenient. In using it the sugar should be scooped up with gentle pressure against the side of the box containing it, and then levelled off. This insures the measure being actually full, but without being overfilled by packing or shaking down.

The soda solution is made of the strength of one grain of bicarbonate of soda to the half-ounce of water. Analyses kindly made for me under the supervision of Dr. Marshall, of the University of Pennsylvania, show that the amount of this salt of soda, equivalent in alkalinity to a half-ounce of ordinary lime-water, equals very nearly one grain. A dozen packages of bicarbonate of soda, each containing one drachm, may be obtained from the druggist at very slight cost. One of these dissolved in a quart of water makes a solution of the proper strength. As the dozen packages are sufficient to alkalinize 768 eight-ounce bottles of the milk-mixture, and as the soda solution will keep indefinitely, it is readily seen that the use of this solution is both cheap and simple.

We may now consider some of the reasons why a soda solution is decidedly to be preferred to lime-water. In the first place, it is a mistaken idea that lime must be added to the food for the sake of the lime-salts required for the baby. Cow's milk, as the tables show, is decidedly richer than woman's milk in mineral matter including lime, and its dilution does not reduce the salts below the proper amount. The sole object of the lime-water is to render the mixture alkaline, and soda does this just as well. I hasten to say that the use of

soda is in no way original with me. Dr. Jaeobi, for one, long ago sanetioned it.

Another objection to lime-water is that when added to milk in the quantity sometimes advised its taste is quite evident, and may be unpleasant to the baby. Another count against it is that when the milk-mixture is heated a chemical reaetion takes place between the sugar and the lime, and a brownish eolor is produced. This is, perhaps, only an objeetion on an æsthetie ground, but there seems no good reason for producing the offending color unless it is necessary. A fourth and more vital objection is that when the milk-mixture is sterilized after lime-water has been added the lime is precipitated in large measure and the desired alkalinity is redueed or destroyed.

Finally, in the effort to overeome the latter objeetion, the difficulties of sterilizing are largely increased. It has been proposed, for instance, that the milk, water, sugar, and eream be mixed in proper proportions and sterilized, and that the lime-water then be added. We ean only do this with safety, however, just before the mixture is to be used, since an earlier removal of the eotton plug allows germs to enter. Consequently, the proper amount of lime-water must be added to each bottle when the child is about to be fed. With the varying amounts of nourishment whieh the baby takes at different ages it is evident that the ealeulation of just how mueh lime-water is to be added on eaeh occasion is a matter not altogether simple. It will certainly seem to the mother to add greatly to the trouble in using sterilized milk; and it must be our objeet to make the proeess as easy as possible.

With regard to the amount of cream to be employed, the formula given allows a eertain latitude, sinee the eream is a variable substanee.

In using the mixture the whole amount needed for the twenty-four hours should be prepared in the morning when the milk arrives, the proper amount plaeed in eaeh bottle aeeording to the age of the ehild, and the bottles plaeed in the sterilizer and heated to the degree of temperature desired.

With regard to the praetiee of sterilizing, it is undoubtedly

true that the process often in some way makes the casein more difficult to digest. On this account Pasteurizing has been proposed to take its place, as it does not materially alter the digestibility. The studies of Koplik and others show, however, that Pasteurizing, in the strict sense of the term—*i. e.*, heating to 75° C. (167°F.)—is not a safe method to be intrusted to mothers, since it does not satisfactorily kill the germs, which will develop in less than twenty-four hours. On this account a modified sterilizing is to be preferred. If the sterilizer (Arnold's) is employed with the hood removed and the lid set slightly ajar, and a brisk but not too hot fire is employed for about forty-five minutes, the temperature of the milk does not go above 80° or 90°C., a temperature which does not materially affect the digestibility of the milk, yet which is sufficient to render the milk practically safe for twenty-four hours. I have myself tested the milk with the thermometer while it was being heated in this way.

Where predigestion of the food is to be combined with sterilizing, as is very often necessary in cases of illness, we may employ the following formula:

Water . . . . . 8 ounces.
One-half a peptonizing tube or one petonizing tablet.
Dissolve.
Add milk and . . . . . 8 ounces.
Peptonize.
Then use—
Peptonized milk . . . . . 2 ounces.
Cream . . . . . 1½ to 2 ounces.
Milk-sugar . . . . . 1 measure.
Water, enough to make . . . . . 8 ounces.
Sterilize as already described.

This formula contains the same proportions as the preceding one, with the exception of the soda, which is increased in amount. No soda solution need be added, since the soda in the peptonizing powders or tablets more than takes its place.

In concluding remarks upon feeding, I beg leave to exhibit this food-warmer, which will be found very convenient, and which is not so widely known as it deserves. When a baby

wakes in the night crying for its bottle, the tedious warming of the milk to the proper temperature is, to say the least, a dreary process. This food-warmer, called the Penniston, consists practically of a hot-water bag with an outside pocket. One or more bottles of prepared milk, sterilized and corked, may be placed in the pocket on retiring, the compartment for water filled, and the whole covered with a woollen cloth. The bottles are thus kept ready for immediate use.

To change the subject altogether, I desire to call the attention of the College to the importance of proper foot-covering for children. Almost always shoes are improperly made. It is often supposed that a baby's foot, because plump and well rounded, is therefore shapeless. Attention has been called to the proper shape of the shoe by various writers, but although the interest of many mothers is awakened, that of most shoemakers is still dormant. Shoes are constantly seen which clearly are cramping the baby's toes, with the natural result of producing ingrowing toe-nails and the like. In the effort to incite needed reform in this direction I have made a considerable number of foot-tracings of children of different ages, some of which I would exhibit to the College. They were prepared by painting the sole with a mixture of lampblack, turpentine, and sweet oil, and then pressing it upon a piece of blotting-paper. They serve to show better than any words can tell that a child's foot, even at a very early age, is, of course, of the same shape as the adult's. The conclusion naturally drawn is that the earliest shoes should be rights and lefts. I came across a shoemaker in London who does make infants' shoes of this shape properly conformed to the foot. Unfortunately, he is such an enthusiast that he goes to extremes, and produces a shoe which, excellent as it is, is not pretty, and can consequently not hope to find a sale, in this country at least. I purchased a pair from him, which I present for your inspection. After submitting a number of foot-tracings to a shoemaker of this city (Steigerwalt), I have received the promise that shoes will be kept in stock which are rights and lefts, and which are conformed as far as possi-

ble to the shape of the feet of children, even of the youngest age at which shoes are needed.

In concluding these remarks upon various matters relating to children, I may call attention to the importance in many cases, as well as the scientific interest, of knowing how rapidly any baby is increasing in length. The determination of weight is simple enough, but the holding and measuring of a child against the wall is an awkward and inaccurate method for measuring its length. I wish to exhibit to the College this apparatus which I have devised to facilitate the measuring. There is absolutely nothing original about it, and the same device has probably been employed repeatedly by others, although I have not happened to see it described. It is, as you see, similar to the foot-measures used by shoemakers, but much enlarged. It is four feet in length, and the pieces which run transversely to the length are eight inches long and are lined with felt. To use it the baby should be laid on its back upon a firm mattress. The end-piece can then be placed above the head and the sliding-piece moved along until it touches the foot, both toes and heel. The apparatus can be constructed by any clever carpenter. It can easily be made to fold into a comparatively small space to be easily portable.

DISCUSSION.

Dr. Arthur V. Meigs: It is gratifying to me to have my work in this field so flatteringly mentioned. For my own part I am not an advocate of the sterilization of milk for children as a rule; it is better, I think, to see that the source and character of the milk are so good that there will be no need for sterilization. Therefore I do not regard sterilizing either as necessary or desirable where good milk can be obtained. My object in adding lime-water to the food I recommend is not alone to make it alkaline, but because experience has shown that it is useful. This is an established fact of observation. The keynote to the successful management of the artificial feeding of infants was struck in the statement I made in a paper read some years ago before the Philadelphia County Medical Society, that woman's milk never contains more than about one per cent. of casein. The older

analyses which seemed to show woman's milk to be very variable in composition are wrong. On the contrary, it is very constant in its composition, and because woman's milk contains only one-fourth the amount of casein in cow's milk the latter fails as a food for infants when given undiluted, because it contains an amount of cheese which the infant stomach cannot digest. Therefore, cow's milk must be diluted sufficiently to reduce the amount of casein to equal that in woman's milk ; afterward the addition of proper quantities of lime-water, milk-sugar, and cream will make it of nearly the same composition as woman's milk. It may be that soda is better than lime-water ; but the experience of the older observers tends to show the usefulness of lime-water. I think that Dr. Jacobi advocated the use of soda some years ago, and it may prove to be the best; but, for my own part, I shall continue to use lime-water until I see further reason to change my views. My reason for using it was not as Dr. Griffith seems to suppose; I have used lime-water not alone to make the milk alkaline, but because experience has shown its value. The experience I have had with my plan has been very satisfactory. A common difficulty is that we are called upon to feed a baby already half-starved and sick from previous bad feeding, and it is difficult to retain the confidence of the parents for a month or longer until some result from good food can be seen, and in less time there is generally but little improvement. I tell the parents that if they are not willing to try my method for a month or more it is not worth while to begin.

Dr. Horatio C. Wood: I know nothing practically about the feeding of infants, and so approach the subject perfectly unprejudiced. It is evident, however, that if we give sodium carbonate we give something that is in the child's body, and has practically no effect upon the general organism; if we give lime, it is a medical agent which may do good or harm according to the condition of the child.

Dr. Meigs: Would Dr. Wood say that lime is not in the child's body?

Dr. Wood: Lime is present in combination, but not by itself any more than phosphorus is.

Dr. H. A. Hare: Some years ago, when I saw a great many children in the service at the Children's Hospital, I was very much impressed by the fact mentioned by Dr. Meigs, that sterilization of milk is not so necessary as is generally maintained. If the source of the milk is evidently bad, then sterilization is necessary, of course; but the universal sterilization of milk is not to be commended, and is rarely done properly for any length of time even in the homes of the better classes. My experience is that sterilized milk given to healthy infants for a certain number of months will not give so good results as unsterilized milk if properly kept. This view is emphasized by the results of certain experiments made by the late Dr. Randolph some years ago with regard to the relative digestibility of raw and boiled milk, carried on in the Philadelphia Hospital. Adults were fed with the milk and given apomorphine after a certain interval, and it

was found that digestion proceeded better in those who had taken the raw milk.

Dr. Charles W. Dulles: In the interest of exactness in scientific discussion, I would call attention to one point in connection with the paper read by Dr. Griffith. He has used the word "germs" in speaking of milk. This, I think, is not an exact term, and would suggest the use of the word "micro-organism." I think the use of the word "germ" for the usual micro-organisms found in milk conveys an entirely false impression in regard to their nature and possibility.

Dr. Dixon: I think that the term micro-organism may be applied with perfect correctness to either animal or vegetable life. In speaking of the germ theory of disease we always refer to vegetable life. I believe, therefore, that the term "germ" is perfectly appropriate.

Dr. Crozer Griffith: In answer to Dr. Dulles, I must say that I do not see that it is matter of much importance, as applied to milk, whether we use the term "micro-organism" or the term "germ." Sterilization will destroy the bodies, whether they are animal or vegetable. With regard to the advisability of using sterilized milk, it is a well-recognized fact that many children cannot digest milk which has been raised to the boiling-point. At the same time it is a fact that mothers of the higher class, who are full of ideas upon the subject, often expect to have the milk sterilized; while it is equally true that mothers of the lower class ought to have it sterilized. We have little experience in this city in the sterilizing of milk in quantity for dispensary practice, but in New York City it has been extensively done and the mothers furnished with the milk thus prepared, instead of being told to prepare it themselves at home. The results have been decidedly encouraging, and strongly favor the use of sterilization. To overcome the objections to sterilizing some modification of the process is required. Some of the New York statistics, notably those of Dr. Koplik, show excellent results following the use of milk which has been raised to 80° or 90° C. Such milk will keep for twenty-four hours without change, and is not altered in its digestibility.

We must remember that the milk which we receive from the milkman in the morning may be twenty-four hours old. We cannot assume that it has been drawn from the cow on the same morning on which we get it. This indicates how important sterilizing may be.

The point, however, which I would make is, not that sterilizing is important—although I believe it to be so—but that if it is used, lime-water is not so suitable for alkalinization as is soda-water, for the reasons which I have stated.

A CASE OF HYPOSPADIAS WITH HERMAPHRODITIC APPEARANCE.

By GUY HINSDALE, M.D.

[Read February 6, 1895.]

The subject is a man twenty-five years of age, who has recently come from Vienna, and calls himself Schmidt. He is five feet three inches in height, of rather heavy build, and his skeleton has all the characteristics of a male. The muscular system is quite well developed, and the limbs are free from an unusual amount of superficial fat. There is no hair upon the face or in the armpits, but an abundant supply in the pudendal region, which resembles, in its horizontal upper limit the hair found on females. The breasts are well developed. There is a mons veneris. The muscular system is that of a man, the thighs and calves are well developed. On examining the privates we find a short imperfectly developed glans penis, with a slight sulcus at the attachment of the frenum. This organ, in a state of erection, is short and curved downward. The urethra terminates at a point in the perineum about two inches posterior to the glans penis and midway between it and the anus. Some rudimentary folds in the median line mark the undeveloped portion of the urethra, inclosing the glans in a well-developed prepuce, and on either side is the scrotal integument, well drawn up so as to resemble enlarged labia majora. The right side is somewhat the larger, and contains, without doubt, a testicle. There is some doubt as to the nature of the contents on the left side. Dr. R. P. Harris, to whom I sent this man, thought the sac might hold an ovary.

At any rate, he expressed the opinion that ovarian stroma was probably present somewhere in the case. The man himself declares that he has menstruated scantily on various occasions through the urethra, and that he has had quite regularly every four, five, or six weeks a bleeding from the nose. These statements, however, I have had no opportunity to corroborate. He states that he has the same sexual inclinations that men have, but I have not been able to learn anything as to seminal discharge, except his statement, that it has occurred in a few drops at the meatus.

Dr. Harris has called my attention to the records of cases, which show that we may have the co-existence of large stature and external conformation of a male with a moderate beard, large penis, a scrotum, and a menstrual discharge, attended with much suffering. In one case, on dissection, a vagina and uterus were found, the vagina opening into the neck of the bladder, and thus communicating with the urethra; while on each side of the uterus were found a Fallopian tube, ovary, and testicle. (Prof. Aekley's case.)

DISCUSSION.

Dr. Harrison Allen: I believe this subject to be a male whose external genital organs are imperfectly developed. The case is an example of the so-called pseudo-hermaphroditism of authors. The mammary glands are unusually well developed; but this peculiarity is occasionally seen in typical males.

ECZEMA OF MUCOUS MEMBRANES.

By M. B. HARTZELL, M.D.

[Read March 6, 1895.]

W. H., a physician, aged thirty-eight years, was seized with follicular tonsillitis of moderate severity, attended by the usual symptoms: pain on swallowing, elevation of temperature, and pains in the limbs and back. On the third day of this attack an eruption of pin-head to shot-sized vesicles appeared on the chin, together with a few small, ill-defined patches of similar lesions on the cheeks, forehead, palms of the hands, thighs, and about the anus. Soon after their appearance these vesicles ruptured spontaneously, giving rise to abundant oozing, especially upon the chin, where the fluid dried into a moderately thick yellow crust. The eruption was accompanied by considerable burning and itching. Coincidently with the appearance of these lesions upon the skin in the localities mentioned, the patient experienced a peculiar drawing, burning sensation in the mouth, which he compared to that produced by the application of a strong astringent; and upon inspection the inner surface of the lips, more especially the lower one, the mucous membrane of the tongue, and cheeks were found to be the seat of innumerable, pin-point to pin-head sized, whitish, opaque vesicles. On the under surface of the tongue the vesicles were the size of split peas, and, many of them having ruptured, shallow ulcers were produced, which were extremely painful; indeed, the pain produced by the eruption upon the tongue was so severe as to prevent the taking of food except in the liquid form for some days. A week later after all symptoms of tonsillitis had disappeared, marked injection of the eyes was noticed, and examination with a loupe disclosed groups of minute vesicles on the bulbar conjunctiva at the inner canthi of both eyes. There was also at this time a slight coryza, due to an eruption of vesicles on the nasal mucous membrane. The patient now began to have pain in both knees, which proved to be the beginning of an attack of subacute articular rheumatism, confining him to bed for a week. The diagnosis of the cutaneous affection, which lasted about three weeks, could not be doubtful—it was clearly an eczema of vesicular type, the only departure from the ordinary course being in the implication of the mucous membranes. This was the third attack of eczema from which the patient

had suffered; four years previously he had been under the writer's care with a severe eczema covering the greater part of the cutaneous surface, and in this attack the mucous membranes were likewise implicated, though not to the same extent, the buccal mucous membrane only being affected. In the first attack, which occurred six years ago, the mucous membranes were not concerned; that attack was attributed by the patient to the application of iodoform to an anal fissure which had been operated upon. In the subsequent attacks, however, no such agency was present to the writer's certain knowledge.

In a few text-books upon diseases of the skin eczema of mucous membranes is briefly alluded to; in most its existence is either completely ignored or positively denied. In a recent book[1] the statement is made that "the mucous membranes are not subject to eczema;" the author declares that "he has never seen eczema of the lips spread to the mouth or the tongue, eczema of the anus to the rectum, eczema of the eyelids to the conjunctiva, or eczema of the penis to the urethra or bladder." These are remarkable statements coming from an observer whose experience must have been large and varied; for, while it is doubtless true that eczema of the mucous surfaces is somewhat uncommon, yet it is equally true that it may occur either by extension from the adjoining skin, or in rare cases as a primary affection. The case briefly related in the beginning of this paper is a striking and typical example of eczema attacking the mucous membranes; nor is this case unique, other cases having been reported by competent observers. Vidal[2] has seen an eczema of the palate characterized by the presence of a group of distinct vesicles; and the same author has seen three cases of eczema of the nostrils. Besnier has reported[3] a case of eczema of the tongue occurring in areas. The disease occurred in a patient twenty-five years of age, and was first revealed by burning during mastication or after eating. The centre of the tongue was occupied by a whitish coating almost normal in appearance; upon the periphery this coating was found only upon the borders of rounded or oval spaces of which it formed the limits, leaving

[1] Pye-Smith: Diseases of the Skin. [2] Gazette des Hôpitaux, 1880, p. 68.
[3] Journ. de Méd. et de Chirurg., December, 1889.

a centre almost smooth. Besnier considered this a form of lingual circinate eczema, having some analogy with the so-called seborrhœic eczema, because of the coincidence between the variations of the lingual lesions and alterations in concomitant eczema of the scalp or trunk.

In connection with this case reference should be made to a curious affection of the lingual mucous membrane described under the various names—lingual pityriasis, lichenoid state of the tongue, lingual psoriasis, geographical tongue, marginate exfoliative glossitis. Molènes[1] regards it as eczema, a view which the writer does not believe correct, since he has had the opportunity to observe a number of cases of this kind, and one in particular[2] during a period of many months, in a patient who never, while under observation, exhibited the least tendency to eczema of the skin, nor any of the symptoms in connection with the tongue which one is accustomed to see in this affection; indeed, there was an entire absence of all subjective symptoms.

In eczema of the vulva it is not uncommon for the inflammation to extend to the vagina, occasioning the most intense itching; and in eczema of the anus the pruritus is frequently far more severe within the anal opening than upon the cutaneous surface, extending oftentimes some distance beyond the sphincter ani. In a paper read before the Fourth Congress of the German Dermatological Society, Von Sehlen[3] called attention to the fact that the mucous membranes adjoining the skin frequently share in the eczematous process, giving rise to inflammations of a special character in these structures. He calls attention in particular to a peculiar form of conjunctivitis associated with eczema of the face, and emphasizes the point that unless the eczematous nature of the inflammation is recognized treatment is apt to be unsuccessful. The author concludes from his observations that certain forms of inflammation of the lips, catarrh of the external ear, certain kinds

[1] Archiv de Laryngologie, December, 1889.

[2] Vide paper by the author: Transient Benign Plaques of the Tongue, Medical News, October 29, 1887.

[3] Monatsheft. f. Praktisch. Dermatologie, Bd. xix., No. 1.

of conjunctivitis, and some inflammations of the anal and genital mucous membranes are eczematous in character, and must be treated accordingly.

When eczema of a mucous membrane occurs coincidently with eczema of the skin, or arises through extension from an adjoining cutaneous surface, the true character of the affection is readily apparent; but when it exists upon a mucous surface alone the diagnosis may be difficult. Owing to the absence of a horny layer and the constant moisture of the parts involved, the aspect of eczema of the mucous membranes differs materially from that of the skin; the vesicles, instead of being transparent, are whitish and opaque, and are ruptured almost as soon as they appear, leaving, when they are of considerable size, shallow ulcers which are more or less painful, as in the case related above. Instead of itching, the usual concomitant of eczema of the skin, there are smarting and burning.

Closely connected with the subject of eczema of mucous membranes is the question of the recession of the eczematous eruption or metastasis to internal organs. As is well known, there is a widespread popular belief, formerly shared by the medical profession, that the cure of a cutaneous eruption may be followed by serious results, owing to the transfer of the disease to some important internal organ. While the writer does not believe that the cure of an eczema may cause disease in internal organs, he is quite ready to believe that the bronchial, gastric, or enteric mucous membranes may be the seat of an eczematous inflammation in those who are the subjects of a widely distributed eczema. Other cutaneous affections occasionally attack the respiratory and gastric mucous membranes, *e. g.*, urticaria, and it does not seem improbable that eczema may do likewise.

The treatment of eczema of mucous membranes differs somewhat from that employed when the skin is the seat of the disease, both in the remedies used, and more especially in the manner of their application. When the mucous membranes of the cheeks and the tongue are concerned the use of ointments is obviously inappropriate, if not impossible, and we

are forced to limit ourselves to liquid applications. As in the ordinary forms of eczema, treatment should have two aims in view, viz., the relief of symptoms and the cure of the disease. When the buccal and lingual membranes are affected itching is not, as a rule, a prominent symptom as in eczema of the skin, but burning and smarting are usually present, and are at times so severe as to demand special attention. For the relief of these symptoms weak solutions of cocaine, ½ to 1 per cent. strength, are markedly effective. An aqueous solution of resorcin, 15 to 20 grains to the ounce, is likewise a useful application, acting not only as a sedative but curatively. Rinsing the mouth with a saturated solution of boric acid every three or four hours is of distinct service, though less useful than the remedies already mentioned. Upon the lips there is not the same obstacle to the use of ointments as in the mouth, and much the same applications may be employed here as upon the skin. In eczema of the genital and anal mucous membranes itching is always a prominent symptom, oftentimes completely unfitting the patient for his duties during the day and depriving him of sleep at night. In these distressing cases the patient is always clamorous for relief of the intolerable itching, and our resources are not infrequently taxed to the utmost. In such cases carbolic acid, in an ointment of the strength of 15 to 20 grains to the ounce, is a most useful remedy. Cocaine is likewise a very effective application for allaying the pruritus. In a case of eczema of the anal mucous membrane under the writer's care nothing gave the relief that this remedy afforded, a single application of a 2 per cent. ointment being sufficient to allay the pruritus completely for six to eight hours, so that the patient slept comfortably the greater part of the night. Menthol is another anti-pruritic of value in these cases, but it is much less reliable than the above-mentioned remedies; while it often acts most happily, it sometimes irritates, even in weak ointments. In the conjunctivitis accompanying eczema of the face Von Sehlen has found weak ointments of ichthyol placed in the conjunctival sac more effective than any other remedy he has tried.

DISCUSSION.

Dr. L. A. Duhring: We should feel indebted to the reader of the paper for bringing this subject before the College, in particular from the fact that this condition is apt to be overlooked and confounded with other conditions. Especially is this the case with eczema of the vulva, which is sometimes mistaken for pruritus, which is entirely different in nature, and amenable to different treatment. I would not agree altogether with the reader of the paper as to the frequency of the condition, for I think it rarer than the paper implies. The case is an unusual one, and its history would suggest that the manifestation was neurotic; for just as there is a neurotic form of herpes so is there a neurotic form of eczema. The treatment in these cases is different from that in ordinary cases.

With regard to the treatment, the main reliance should be upon internal medication. While in eczema of the skin external treatment is very valuable, in eczema of mucous membranes we must depend mainly upon internal treatment for permanent cure. This is also true for eczema of the eyelids and of the vulva. I think that if we look for the exciting cause we shall find in most cases of eczema that the causes are internal rather than local in their nature.

With regard to eczema of the anus, my experience is that many cases which are diagnosticated as itching hemorrhoids are really eczema. Because there are no other spots of eczema upon the body, and because of some swelling and prominence of the mucous membrane, the lesion is taken for a pile. Treatment for eczema, however, will often result in a cure of the condition.

Dr. G. G. Davis: This is an interesting disease which Dr. Hartzell has brought before us, because it relates both to skin diseases and to surgery. In the case of eczema in the anal region, which has been mentioned, it is a question whether the eczema is a cause or an effect. Professor Duhring has spoken of the difficulty in diagnosis and that hemorrhoids might cause the rectal discomfort. No doubt exists that hemorrhoids may cause irritation and itching, and, therefore, they may cause eczema. If I should find eczema and itching associated with hemorrhoids, I would be inclined to class the latter as the primary cause. A person may have inflammation extending entirely around the anus, but if the discomfort exists inside, I would be inclined to look for hemorrhoids as the source of the trouble.

As regards the existence of eczema in the mouth, I think it would be hard, in the absence of confirmatory evidence in the occurrence of the disease and the course which it takes in other parts of the body, to distinguish it from herpetic eruptions. The description given seems to me to resemble very much that of the herpetic eruptions which are so common in the mouth.

Of course, if one should encounter a case of eczema in which the periodical outbreaks upon the surface of the body were accompanied by others on the mucous membranes, one would be strongly tempted to regard them as identical in origin; but eczema is such an extremely common disease that one would expect it to attack them more frequently than appears to be the case.

Dr. H. A. Hare: I would like to ask a question of the reader of the paper. It is one of interest to therapeutists as well as special practitioners. Does not cocaine lose much of its therapeutic effect by combination with fatty substances as compared with watery solutions? I also would ask whether the reader found any difference in the anæsthetic power of cocaine and its salts, the hydrochlorate, for instance, when made into an ointment?

Dr. Hartzell: I am well aware that the nervous system is frequently supposed to be at fault in many cases of eczema, but I do not think we need to seek so far for the cause in this case; the patient already showed two manifestations of the rheumatic poison, viz., tonsillitis and arthritis, and we may be permitted to suppose that the eczema was due to the same cause.

Concerning the diagnosis, there could be no doubt; there was entire absence of grouping of the vesicles such as occurs in herpes, but they were scattered about irregularly over the mucous membrane of the cheeks and tongue.

In reply to Dr. Hare's questions, I would say that I found it necessary to use larger quantities of cocaine in ointment than in aqueous solution, less than 5 per cent. having but little effect. Of course, it is understood that relief is only obtained in anal pruritus when the mucous membrane is affected. I have had no experience with the alkaloid, having always used some one of the salts, usually the muriate.

TETANUS CEPHALIC. GENERAL TETANUS ASSOCIATED WITH HEMIFACIAL PARALYSIS. RECOVERY.

By De FOREST WILLARD, M.D.,
SURGEON TO THE PRESBYTERIAN HOSPITAL.

Assisted by JAMES I. JOHNSTON, M.D.,[1]
RESIDENT PHYSICIAN, PRESBYTERIAN HOSPITAL.

[Read March 6, 1895.]

The coexistence of unilateral facial paralysis with tetanus is a sufficiently peculiar combination to warrant the classification of the cases presenting these two prominent symptoms into a distinctive class, to which has been applied the title of tetanus cephalic, or head tetanus, Kopf-tetanus, tetanus hydrophobicus, etc. The latter term was employed by Rose from the fact that the spasm of the muscles of deglutition often occasioned such dysphagia as to resemble hydrophobia; but its use is misleading. In the majority of the cases of recovery the spasm did not extend beyond the muscles of the jaw and pharynx; but in the case about to be reported the disease became general, and all the muscles of the body were involved, thus making a case of general tetanus.

The rarity of cephalic tetanus is illustrated by the fact that this patient is the only reported living case in America, while but two other American cases have been placed upon record, that of Phelps (*Transactions New York Academy of Medicine*, November 12, 1888), which died on the sixteenth day, and Hunt's case (Transactions College of Physicians, Philadelphia, 1866, 466), which died on the sixth day.

In the variety known as cephalic, the tetanus is produced by

[1] Not a fellow of the College.

injury affecting one of the cranial nerves, and is accompanied by hemifacial paralysis. The history of the majority of cases of head tetanus is that of slow onset, and, as in ordinary tetanus, the severity of the disease is determined by the rapidity of onset and of development, the acute cases being speedily fatal while the chronic ones frequently recover.

History. Joseph T., twelve years of age, was admitted to the hospital wards November 23, 1894, with the following history: Ten days before admission, while at play, he was struck by a small, dirty stick taken from the ground. A slight wound was inflicted near the inner canthus of the right eye, just breaking the skin. The wound was dressed in the receiving ward of the hospital, and the patient referred to the surgical dispensary, where two or three days later the wound was again dressed and found in good condition. The patient did not return again for about a week, when it was noticed that he had a peculiar spastic gait, and that he also had paralysis of the facial nerve on the right side, with trismus. While in the dispensary he had a slight attack of spasm of the muscles of the jaw and neck. He stated that he first began to walk unsteadily about three days before, and found he could not whistle nor open his jaw.

The symptoms probably commenced about one week after the receipt of the injury. The child was taken into the hospital ward at once, on probably the fourth or fifth day of the disease.

On admission the patient was suffering from peripheral paralysis of the facial nerve on the right side, which was the seat of injury; he had a peculiar jerking gait and suffered from stiffness of the muscles of the legs, abdomen, back, and neck with marked trismus. The paralysis involved the fibres supplying the frontal and orbicular muscles as well as those of the cheek. The risus sardonicus was naturally present only on the unaffected side.

From the history the patient had had no spasm before that seen in the dispensary. Near the inner canthus of the right eye was a red, œdematous area, the seat of the wound, now healed. There were no signs of suppuration of the wound, rendering it impossible to obtain material for making cultures. He complained of no pain in the wound or elsewhere. The pupils were normal and reacted readily both to light and distance, while the right eye could not be closed and was the seat of conjunctivitis. Trismus was by this time so marked that the patient could open his mouth only about one-fourth the normal amount, and with difficulty could protrude his tongue, which was coated and at the edges bore evidences of having been bitten. The muscles about the neck were prominent and rigid, especially the posterior group. The chest was well formed, and the head and lungs were normal. The abdominal muscles and those of the back were hard and prominent; otherwise the abdomen was negative on examination. The scrotum and testicles

Fig. 1.

Fig. 2.

were normal, the prepuce was adherent, but was easily pushed back, and considerable smegma was removed. The temperature was normal and his general condition was good.

The first night in the hospital the patient slept well, but the following night he was quite restless and cried out several times in his sleep. Three days after admission, the eighth of the disease, the trismus was much more marked, the muscles of the neck and back were stiffer, and a tendency to opisthotonos was first noticed. He then for the first time complained of continuous pain in the back and legs, and he was quite rigid all over except his arms, which could be readily used, although his grip was weak and his thumbs presented a tendency to be drawn into the palms of the hands. He resisted the most vigorous efforts to flex the legs on the thighs, but could slowly flex them voluntarily when told to do so; the right leg was the more rigid.

On searching for the cause of the facial paralysis an indistinct history of a "running ear" on the right side was obtained, and a careful examination was made by Dr. C. A. Burnett, aurist. The tympanic membrane was found to be normal, as well as the meatus and the auditory canal, and there were no evidences of mastoid disease. On this date the patient bit his tongue twice, but was seen in no marked spasm.

The day following the boy was etherized and the cicatrix loosened by a tenotome, as the scar could not be excised without causing subsequent contraction of the lower lid and eversion. The opisthotonos and trismus increased, and only liquids through a tube could be taken. During deglutition slight spasm of the muscles of the pharynx occurred (hydrophobicus). Pain was complained of principally in the right heel and calf of leg. When the patient was turned on his side the arching of the back and legs and the retraction of the head were greatly marked and accompanied with flushing of the face.

On November 29th, the twelfth day of the disease, the temperature was 101.4° F., pulse 98 and respiration 20; this was the highest temperature during the course of the disease. By December 1st some improvement of the lad's condition was noticed. He slept better, pulse and temperature were normal, he could swallow much better, and the trismus was not so great. At this time he could flex his leg on the thigh (the right one), but not the left. The right side was the side of the injury. The opisthotonos remained about the same, as far as the head, neck, and body were concerned, but he still complained of pain in the back and legs. There were still occasional spasm of pharyngeal muscles, accompanied by flushing of the face during deglutition, and the patient bit his tongue once or twice.

On December 5th (nineteenth day) the trismus and opisthotonos again increased, pains in the right leg and heel were more marked, and the temperature rose to 99.8° F., pulse 100, but weaker, and respiration 24. The entire body was now so rigid that when rolled upon his side the position of the

limbs presented precisely that of a frozen cadaver. The feet were extended in a straight line with the legs, and none of the joints of the lower extremities could be flexed except by full force of a man's strength. The bowels were constipated, requiring enemata.

On being visited on the morning of this date he was found by the resident uncovered and with the bed-clothes in disorder and soiled by feces and urine, possibly the result of an opisthotonos spasm, although heretofore no general convulsion had been seen. The next day he complained of pains in the head and back, was quite rigid, and had an involuntary discharge of urine. During the night previous he had bitten his tongue and cried out with pain in his right leg, which was relieved by rubbing. He then improved, and by December 11th his condition was the best since admission to the hospital. There was no change in the facial paralysis. At this time a careful examination of his eye-ground was made by Dr. George Strawbridge and the following report made: "There is anæmia of both optic nerves, especially the left. There is no choked disk and no signs of tortuosity of the veins. Both show physiological excavations." Otherwise the eye-fields were normal, and there was no evidence of intracranial pressure.

An examination of the ears was again made at this time, and the tympanic membrane was found to be normal on both sides, and no pus was found in the external auditory canal. The handles of the mallei were plainly seen. The patient now was on the highway to recovery.

On December 14th (twenty-eighth day), while the paralysis of the face was still complete, reactions to the different electric currents were tested by Dr. James Hendrie Lloyd, as follows: "To faradism, on the right side, the response is free to a moderate current, perhaps slightly less than on the left. To galvanism the response is free to a medium current (eight cells). Because of the excitation of the patient reactions of the different poles were not taken." Dr. Lloyd kindly saw the case daily and made many helpful suggestions.

On the following day the patient attempted to get out of bed in the absence of the nurse, and, falling to the floor, received a wound of considerable size on the scalp, which required suturing. For two nights before the accident he had been very noisy, rebellious, and evidently delirious. At one time he was so boisterous that morphia hypodermatically was given, and for some time afterward he was quite stupid, although only a small dose had been employed. For a short time after the accident the patient was much more rigid, but this soon passed away.

On December 19th, about one month after admission to the hospital, he was bright, quiet, and rational; there was but slight rigidity, while he could move all his limbs readily and open his mouth easily. He expressed himself as being very hungry—for a month he could take nothing but fluid food, and would have nothing but milk. At this time he still occasionally voided urine involuntarily. For the next ten days he improved very slowly and

was very irritable, seeming much better in the evening than in the morning hours. He was now moved back into the general ward, from which he had been isolated. His facial paralysis, which had begun to improve a few days before, was now rapidly disappearing, and there were scarcely any signs of trismus, but there was still some hardness of the muscles of the back and abdomen. His pain had almost disappeared, and by January 7, 1895 (fifty-two days), the patient was up out of bed. On January 9th he was able to walk alone, but with a halting, spastic gait. The facial paralysis had now almost disappeared and both eyes could be readily closed. His gait improved slowly, and at the present time the boy is perfectly well.

Remarks. The features worthy of note in the above case seem to be, first, that the patient suffered evidently from general traumatic tetanus of a chronic nature and recovered after an illness of about two months; secondly, there was associated with it a unilateral facial paralysis which disappeared with recovery from the tetanus; third, the wound was an insignificant one, but involved the filaments of a cranial nerve; fourth, throughout the course of the disease the patient was not at any time in a markedly asthenic condition nor threatened with asphyxia; fifth, there was a decided improvement of the symptoms for a week after the subcutaneous section of the nerves in the injured area; sixth, the infecting bacillus probably came from the earth and reached the system through the markedly susceptible infection-atrium of the eyelid. The stick may have been soiled by manure also, which is a favorite soil for the growth of the bacillus.

Hulke (*London Lancet*, July 12, 1882) reports a case of "Tetanus with Facial Paralysis" occurring in a man twenty-seven years of age, in which there were wounds of both the finger and the nose. He had a right-sided facial paralysis with initiative symptoms of trismus. The patient died about two weeks after the receipt of the wound of asphyxia, due to spasm of the muscles of respiration. There was here complete absence of tetanic spasms of the trunk and limbs, they being of a clonic character.

Nankivell (*London Lancet*, July 14, 1883) also reports a case of "Acute Traumatic Tetanus complicated with Facial Paralysis," which proved fatal four days after trismus first appeared

and ten days after a slight attack of facial erysipelas from a wound on the bridge of the nose. In this case, also, the paralysis was on the side of the face; there was no opisthotonos, but the patient had several general spasms, and died of asphyxia caused by spasm of the muscles of respiration. The man had attended the out-patient department for his erysipelas, and the day he paid his last visit and was discharged cured being cold and wet, Nankivell offers as an explanation for the facial paralysis, the probability of his catching cold and suffering from an inflammation in the aqueductus fallopii, and thus producing the palsy.

Huntingdon (*London Lancet*, September 17, 1892) also reports a case of tetanus with double facial paralysis which recovered. In this case a lad of fourteen years fell and received a small wound on the forehead. Trismus appeared in ten days, and six days later the jaws were firmly locked and there was complete paralysis of both sides of the face. This patient also suffered from frequent cramps in the legs and abdomen, while the arms were but slightly involved. One week after the paralysis became complete it began to subside on the left side, and in another week the right side began to improve. He was discharged in six weeks almost well, and when seen six months later was in perfect health. In this case dysphagia was the prominent symptom.

As will be noted, in none of these cases was there marked opisthotonos; they all suffered from dangerous symptoms of asphyxia, while the present case had very marked opisthotonos, but practically had no embarrassment of respiration, suffering only from pharyngeal spasm occasionally during deglutition.

Gowers, writing of cephalic tetanus (Kopftetanus), called also hydrophobicus by Rose, says that it results from wounds of the head, chiefly of the fifth nerve. Its chief peculiarity is that the initial trismus is associated with paralysis of the face on the same side of the injury. He also states that all parts of the facial nerve are involved, but the cause is not known. as no degeneration of the nerve has been found; hence it has been supposed to be of a reflex character.

Cultures were not made in the present case, as the wound was healed at the time of admission to the hospital. Later, and in the absence of pus, it was deemed unwise to open the wound or to attempt any inoculation experiments on the white mouse, as the bacilli are but infrequently found in the blood.

Examination of the urine on two occasions gave negative results.

The *treatment* pursued in the case was as follows:

The patient was put to bed in a darkened and isolated room, which was kept at a temperature of about 72° F. and guarded from draughts of air, from noises, and from disturbance. The diet throughout consisted almost entirely of milk, the patient preferring this to other forms of liquid food, and never tiring of it. As there was a marked tendency to constipation, the bowels were kept open by calomel with an occasional enema or brisk saline. The surgical treatment consisted of subcutaneous section of the nerve filaments leading to the cicatrix with a narrow tenotome, which procedure was followed for several days by a subsidence of the symptoms. The medical treatment consisted of the administration of bromides, chloral, and opium, increased from small doses (he was twelve years of age) until he took each twenty-four hours seventy-five grains of bromide, thirty grains of chloral, and thirty-six drops of tincture of opium deodorata. These doses were maintained steadily for four or five weeks. He was never narcotized, and during the day slept but little. On December 15th, when he became so noisy and unmanageable, he was given one-eighth of a grain of morphia hypodermatically, which was the only hypodermic given. At no time were we called upon to give an anæsthetic for convulsions. When he began to convalesce and was on a fuller diet milk-punches containing two drachms of whiskey were given three times a day.

On February 15th the patient was discharged from the wards cured. All signs of facial paralysis were absent and the boy was the picture of health. During the early part of the attack an attempt to procure and use the antitoxine for tetanus, as recommended by Tizzoni and Cattani (*Medical Press and*

Circular, London, 1894, lviii. 153),[1] was made, which proved futile, as none could be obtained. This was unfortunate for the antitetanine, but possibly not for the boy, as he is now entirely recovered, and the plan of treatment by antitoxines is still in its experimental stage. When dealing with a poison of such intense virulence, however, as that of tetanus any and all means of cure should be employed. At the time I was deeply disappointed at the failure to secure the antitoxine, but the favorable result under the plan of treatment adopted is most satisfactory.

Klemm (*Berlin. klin. Wochenschr.*, 1893, p. 63), as well as Brunner, believes that the injury need not be limited to the distribution of the facial nerves, but that the paralysis, which is toxic, may be due to injury of any of the cranial nerves. Klemm very properly draws a distinction between the cases where the spasm remains limited to the muscles affected by the initial symptoms, as in true cephalic tetanus and in those (as in the case under consideration) where the spasm becomes general and in whom the conditions practically become those of ordinary tetanus. It is advisable to distinguish such cases from those not associated with paralysis. It is quite possible that all cases of tetanus commence with these local spasms in the region of the injury; but the local condition, being in the hand or foot, is unobserved, especially in acute cases, where more prominent symptoms speedily develop. The facial region being so abundantly supplied with nerve filaments is probably more susceptible to irritation of the tetanus bacillus and is a most favorable infection-atrium. The facial muscle-mechanism is also exceedingly delicate. The presence of this bacillus in the earth must be limited, as a very large proportion of injuries become soiled with earth.

The poison of tetanus has two modes of action: first, peripheral, by direct alteration of the peripheral nerves; second, by reaching the central nervous system through the circulation.

It is difficult to decide why the symptoms in grave cases

[1] Also Berlin. klin. Wochenschr., 1893, vol. xxx. pp. 1185, 1215, 1245, 1265; 1894, vol. xxx. pp. 64, 772.

remain distinctly local. But the slow onset would indicate that an inherent germicidal action was at work destroying the invading bacilli in some instances; while in other cases this phagocytosis is overpowered by the virulence of the poison, and the toxin is admitted to the general system.

Billroth (*Lehrbuch d. Allgem. Chir.*, S. 507) states that the character of the symptoms points evidently to a local contagion.

Not every case of injury of the cranial nerves, even when followed by tetanus, is accompanied with facial paralysis. In a case seen some years ago in consultation with Dr. J. A. Ogden the wound was in the forehead and had nearly healed when symptoms of tetanus developed, but there was no paralysis. I promptly excised the scar, but the patient died in two days. Dr. Ogden, in a recent letter to me, reports two cured cases of tetanus, but in neither case was there associated paralysis.

Merlich (*Arch. Psychiat.*, 1892, xxiii. p. 672) gives a most valuable paper on this subject, and a large number of references to the literature. These, with the references found in the *Index Catalogue* and the *Index Medicus*, show that much valuable work has been done upon this subject. Merlich also gives several excellent microscopical drawings of the appearances found in the motor region of the trigeminus.

Taf, xiii., 1, 2, 3, demonstrates the degeneration and vacuolation incident to this condition. He also agrees that this variety of Kopftetanus may follow an injury to any of the cranial nerves, but is more frequently found after injury to the orbicular and nasal regions.

The influence of the tetanus bacillus in the production of this condition seems thoroughly demonstrated, thanks to the work of Nicolaier, in 1884, the first one to show the causative action of the soil in the production of this disease. His experiments, followed by those of Rosenbach, and especially those by Kitasato (*Deutsch med. Wochenschrift*, 1889, xv., No. 31, p. 635; also *Zeitsch. f. Hygiene*, 1890, B. vii.), who isolated the pin-shaped bacillus and obtained pure cultures, are most valuable. Guinea-pigs and white mice are the animals especially susceptible to this poison. The pinhead and drumstick appear-

ance of the short rod is evidently due to sporulation at the end or ends. The bacillus is markedly anaërobic.

A number of alkaloids, tetanin, tetanotoxin, muriate of spasmo-toxin, have already been separated, and it is probable that in time the product of the bacillus will be employed for the cure of this disease, as is indicated in the present use of the various antitoxins. The use of tetanus antitoxin has been chiefly advanced by Tizzoni and Cattani.[1]

Brunner[1] by a series of experiments determined that injections of cultures of the tetanus bacillus into animals, or of the cultures free from the bacilli, will produce tetanus, the spasm starting after a few hours in the muscles in the region injected. If the injection is made in one side of the face, *e. g.*, the left, this is first involved, then the right side of the face, then the left forclimb, then the right, and then the rest of the body.

Post-mortem examinations of the animals revealed no characteristic microscopic changes in the nervous system or any of the tissues. He gives a number of excellent illustrations of the effects on rabbits and guinea-pigs.

Injections of a considerable amount of the poison in the face often determine a paralysis of the muscles in the immediate region; injection into the blood current or peritoneal cavity produces general tetanic manifestations, not preceded by local spasm. The bodily temperature of the injected animal sank steadily. Attempts to obtain from the tetanus poison separate alkaloids, as tetanin, tetanotoxin, spasmotoxin, as causes of the different manifestations, were not successful. The symptom-complex is produced by the undivided filtrate of cultures.

The tetanus poison circulates in the blood of animals suffering with tetanus; it is also found in the urine and saliva.

Injections of the poison into a motor sensory nerve, *e. g.*, sciatic, produce the same effect as a subcutaneous injection—first local, then general spasm. Injection under the dura mater produces, first cephalic, later general tetanus.

[1] Medical Press and Circular, London, 1894, vol. lviii. p. 155. Berlin. klin. Wochenschrift, 1893, vol. xxx. pp. 1185, 1215, 1245, 1265; 1894, vol. xxx. pp. 64, 72.

[2] Exper. u. Klin. Studies über der Kopftet. Beiträg klin. Chir., B. lx. pp. 83 and 269. Berlin. klin. Wochensch., 1891, vol. xxviii. p. 881. Deutsch. Zeitsch. Chir., B. xxx. S. 574.]

No.	Reporter	Reference.	Sex.	Age.	Acute or chronic.	Local or general.	Result.
1	In Richter's Chir. Bibliothek, 1791,	Cited by Brunner, Beitr. f. klin. Chir., 1892-93.	M.	10	Acute	General	Recovery.
2	Hurst,	Trans. Phila. Coll. Phys., 1862, iii. 465.	M.	16	Acute	General	Death.
3	Larrey,	Cited by Rose.	M.	30	Acute	General	Death.
4	Zuicke,	Charite Ann., ix. p. 366.	F.	39	Chronic	Local	Recovery.
5	Jacksch,	Wien. med. Presse, 1888, No. 18.	F.	38	Chronic	Local	Death.
6	Duplay, cited by Séreins,	De la contracture réflexa d' origine traumatique, Thèse, Paris, 1880, No. 435.	M.	19	Chronic	Local	Recovery.
7	Nicolaysen, cited by Séreins,	" " " "	M.	23	Chronic	Local	Recovery.
8	Terelon and Schwartz,	Revue de Chirurgie, 1888, No. 1.	M.	16	Acute	Local	Death.
9	Travers, cited by Pflüger,	Die sensorieschen Functioners des Ruckenmarke, p. 81.	M.	11	Chronic	General	Recovery.
10	Larrey,	Mémoires de Chir. melit., iii. p. 307; also Pflüger, l. c. p. 82.	M.	...	Chronic	General	Death.
11	Crossonard,	Etude a l'Appre de l'Origine infect. du tetanos, Thèse, Paris, 1887.	F.	33	Acute	Local	Recovery.
12	Dumshard,	Cited by Séreins, l. c.	M.	55	Chronic	Local	Recovery.
13	Kirchhoff,	Berl. klin. Wochen., 1879, No. 25.	F.	52	Acute	General	Death.
14	Pollock,	Cited by Rose.	M.	33	Chronic	.....	Death.
15	Rockliffe,	Brit Med. Journ., 1890, No. 1591, p. 86	M.	7	Chronic	General	Recovery.
16	Middledorpf,	Bresl. ärztl. Zeitschr., 1883, p. 8.	M.	9	Chronic	General	Recovery.
17	Güterback,	Arch. f. klin. Chirurg., B. 30, p. 836	M.	21	Chronic	General	Death.
18	von Wahl,	St Petersburg med. Wochen., 1882, No. 39.	M.	41	Acute	Local	Death.
19	Kleum,	Deutsche Zeitsch. f. Chir., 1889, xxix 3, p. 168	F.	40	Chronic	Local	Recovery.
20	Hadlick,	Berl. klin. Wochen., 1885, xxii. p. 266.	M.	2½	Chronic	General	Recovery.
21	Rose,	Ibid, p. 86.	M.	28	Acute	General	Death.
22	Rose,	Ibid., p. 88.	M.	...	Acute	General	Recovery.
23	Kirchner,	Aerztl. Bericht. Preuss Feld-dazarth, etc. Erlangen, 1872.	...	...	Acute	General	Death.
24	.....	St. Bartholomew's Hosp. Rep., 1874, Appendix, p. 40.	...	...	Acute	Local	Death.
25	von Langenbeck,	Berl. klin. Wochen., 1869, No. 35.	M.	7	Acute	General	
26	Lehrnbecher,	Bar. ärztl. Intelligenzblatt. 1882, No. 46.	M.	49	Acute	General	Death.
27	Mayer,	Prag. med. Wochen., 1883, No. 34	M.	18	Chronic	General	Recovery.
28	Bond,	Brit Med. Journ., Nov. 10, 1883, p. 918.	M.	23	Chronic	General	Recovery.
29	Bernhardt,	Zitschr. f. klin. Med., 1884, p. 410.	M.	32	Acute	General	Death.
30	Maissurianz,	St. Petersburg med. Wochen., 1887.	M.	35	Chronic	Local	Recovery.
31	Triglis,	Gironale di Neuropatologia, 1884, i. p. 80.	M.	50	Chronic	Local	Recovery.
32	Genffré,	Lo Sperimentale, 1887, p. 380.	M.	51	Chronic	.....	Recovery.
33	Launois,	Rev. de Méd., 1890, ii. p. 168; also Lyon Médicale, 1889, lxii. p. 380.	M.	69	Acute	Local	Death.
34	Charcot,	Soc de Chir., Oct. 10, 1888.	M.	...	Acute	General	Death.
35	Perret,	Cited by Albert, Etude sur tetanos cephal que, p. 26.	M.	59	Acute	General	Death.
36	Phelps,	New York Acad. of Med., Nov. 12, 1888.	M.	...	Acute	General	Death.
37	Remy and Villar,	Gaz. des Hôp., 1888, No. 142	M.	36	Acute	General	Death.

No.	Reporter.	Reference.	Sex.	Age.	Acute or chronic	Local or general.	Result.
38	Brennecke,	Inaug. Dissert., Göttingen, 1890.	M.	12¾	Chronic	General	Death.
39	Widenmann,	Würt med Correspondenzblatt, 1889, No. 8.	M.	8	Acuto	General	Death.
40	Roberts,	Lancet, July 11, 1891.	M.	64	Acute	General	Death.
41	Brunner,	Berl. klin. Wochen., 1886, No. 7.	M.	27	Acute	Local	Death.
42	Brunner,	" " "	M.	38	Acute	General	Death.
43	Brunner,	Beitr. f. klin. Chir., 1892, p. 291.	M.	19	Chronic	General	Death.
44	van Spanje,	Weekbl. v. nederl. Tijdsch voor Geneestr., 1891, ii No. 10.	M.	60	Acute	General	Death.
45	Billroth,	Chirurg. klin. Wien, 1868, No. 77.	M.	37	Acute	General	Death.
46	Nankivell,	Lancet, July 14, 1883.	M.	33	Acute	General	Death.
47	Oliva,	Gazette de Chir., 1886	M.	52	.....	Local	Death.
48	Wagnor,	Schmidt's Jahrbuch, 1884, p. 139.	M.	42	Acute	Local	Death.
49	Nerlich,	Inaug. Dissert., Halle, 1892.	F.	46	Acuto	General	Death.
50	Thenée,	Berl klin. Wochen., 1880, p. 531.	F.	55	Acuto	General	Death.
51	Terrier,	Cited by Sériens, loc. cit., p. 31.	M.	49	Chronic	Local	Recovery.
52	Gosselin,	Cited by Terilon and Schwarz, loc. cit.	M.	...	Acute	General	Death.
53	.....	St. Thomas' Hosp. Rep., x. p. 461.	...	...	Chronic	General	
54	Sériens,	L'Union Méd., Dec. 1886.	M.	59	Acute	Local	Recovery.
55	Buss,	Centralbl. f. Chir, 1890, p. 831.	...	...	Acute	General	Death.
56	Guastalla,	Cited by Rose, p. 89	F.	40	.....	General	Recovery.
57	Pflüger, loc. cit.	Cited from Med.-Chir. Trans., vol. iv. p. 25.	F.	50	.....	General	Recovery.
58	Zsigmondy,	Aerztl. Bericht v allg. Krankenhaus. Wien, 1879, p. 76.	F.	41	.....	Local	Death.
59	Buisson,	Gazette hebdom., 1888, No. 3.	M.	60	Chronic	General	Recovery.
60	Wartmann,	Cited by Bruuner, loc. cit., p. 310.	M.	11	Acute	General	Recovery.
61	Behr,	Inaug. Dissert., Tübingen, 1891.	M.	25	Acute	General	Death.
62	Brunner,	Loc. cit., p. 314.	M.	...	Acute	Local	Death.
63	Brunner,	Loc. cit., p. 314.	M.	13	Chronic	General	Recovery.
64	Poisson and Rappin,	Gaz. Méd. de Nantes, 1893-94, xii p. 93.	F	30	.....	Local	Recovery.
65	Caird,	Edinburgh Hosp. Rep., 1893, i. p. 491.	M.	12	Acute	General	Death.
66	Navarre,	Lyons Médicale, 1894, lxxv. p. 152.	F.	56	.....	Local	Death.
67	Reclus,	Cliniques Chirurg., Paris, 1894, 8vo. p. 150.	F.	56	.....	Local	Recovery.
68	Reclus,	Loc. cit.	M.	43	.....	Local	Death.
6	Reclus,	Loc. cit.	M.	19	.....	Local	Recovery.
70	Reclus and Chaput,	Loc. cit.	...	...	.....	.....	
71	Caird,	Loc. cit.	M.	26	Acute	General	Death.
72	Caird,	Loc. cit.	M.	57	Acute	Local	Death.
73	Campos,	Cronicl. med.-quir de Habaus, 1890, xvi. p. 255.	M.	39	Acute	Local	Death.
74	Hulke,	Med. Press and Circ., London, 1882, xxxiv. p. 25.	M.	27	Acute	General	Death.
75	Willard,	Trans. Coll. Phys. Phila., 1895; also Univ. Med. Mag., 1895.	M.	12	Chronic	General	Recovery.

The tetanus poison cannot cause muscular spasm by direct action, but must act through the nervous system; and if a motor nerve to a region is cut, injections of the toxin in this region cannot produce spasm. The centres in the medulla, pons, or cord must also be intact for the production of spasm, but the higher centres are not essential. The poison does not act reflexly, but by a direct action on the central motor apparatus, probably reaching this along the nerve trunks rather than by the blood or lymph channels. It can ascend the motor as well as the sensory tract.

The cause of facial paralysis has given rise to much discussion. In my own case a most careful investigation was made to exclude the possibility of its being merely a coincidence due to independent causes, and the absence of middle-ear disease, intracranial growths, brain abscess, etc., was thoroughly demonstrated.

In the present stage of our bacterial knowledge it seems much more rational to refer it to a direct toxic effect of the poison acting upon the filaments of the seventh and fifth nerves rather than to a "cold, rheumatism, etc."

I have succeeded, with the kind assistance of Dr. Alfred Hand, Jr., in collecting 75 cases of cephalic tetanus. 57 males and 13 females are noted. In 45 acute cases (counting those acute ones in which the symptoms have developed within the first week), 39 died and only 4 recovered; a mortality of 90 per cent. Of 32 chronic cases (where the symptoms arose after the first week), 8 died and 24 recovered; a mortality of 25 per cent.

Gowers states that all cases over twenty-five years of age died; but my table shows that of acute cases (one week) there were 2 recoveries in 32 cases in persons over that age, and 13 recoveries in 15 persons who were classed as of the chronic variety. Under twenty-five years, in 12 acute cases there were 2 recoveries, and in 16 chronic cases 13 recoveries.

In the 75 collected cases when the spasm extended to the muscles of the jaw, throat, and neck they have been denominated "local;" while if opisthotonos and spasm of limb muscles

occurred they were denominated as "general." There were 29 cases of the former condition and 46 of the latter. Of the "local" cases, 14 recovered and 15 died; while of the "general," 14 recovered and 32 died.

In this form of tetanus, as well as in general tetanus, the actual mortality is far higher than statistics will indicate, as in my personal experience I have certainly seen twenty deaths from tetanus to one of recovery, and yet none of the twenty fatal cases are on record.

DISCUSSION.

Dr. J. Hendrie Lloyd: I had the opportunity, through the kindness of Dr. Willard, of studying this case and of following its progress from day to day. I think that Dr. Willard should be congratulated upon bringing it to such a successful termination. Recovery is a rare result in all forms of tetanus, although, perhaps, not so rare in this form as in some others. As Dr. Willard has correctly stated, this is a rare type of tetanus. This case is probably the first ever brought to the attention of the profession in this city. I believe that only a very few cases have been reported in America. The disease presents some interesting problems which are difficult to solve. This case conformed closely to the type known as cephalic tetanus. The affection was caused by a wound in the neighborhood of the orbit with a dirty stick. In every instance, I think, the disease has resulted from a wound in the area of distribution of the fifth nerve. In this case the symptoms presented were typical of the cephalic form of tetanus. The paralysis of the seventh nerve is the distinctive feature of most of these cases, whereas, the general tetanic symptoms are often less marked than in ordinary tetanus. The fact that this case presented some of the general symptoms of tetanus (as opisthotonos and rigidity of the limbs), should not remove it from this category, the cases of which are not as a rule to be compared in severity with ordinary tetanus. Some time ago I saw two cases of general tetanus at the Philadelphia Hospital, in colored men, both suffering from wounds in the sole. In them the general symptoms were more marked than in this case; there was more opisthotonos, and the cases bore a more grave aspect. The paralysis of the seventh nerve in cephalic tetanus is hard to explain. I think that an explanation may be found possibly in the position of the wound in the distribution of this nerve. In general tetanus we have an effect upon the central nervous system; but here we have paralysis, or in some cases spasm, from a direct impression upon the periphery of the seventh nerve.

It may be that the poison of tetanus acts as a paralysant when brought into direct contact with the periphery of a nerve or the nerve-endings. As to the exact pathological condition of the nerve, it is evidently not an ordinary neuritis. I think that all authors are in accord that there are no evidences of neuritis in the nerve and no alterations in the electrotonus; in other words, there are no reactions of degeneration in the facial nerve. This was the case in Dr. Willard's patient. The examination was not so thorough as I should have liked to make it, because the boy became much excited, and I did not wish to disturb him any further for fear of increasing the tetanic spasms.

The theory of a reflex origin for this case cannot be defended. I think that the so-called reflex affections of the nervous system must be explained by direct action. In a case of cephalic tetanus recently reported by Roberts, of London, paralysis of some of the internal and external muscles of the eye on one side and of the seventh nerve upon the opposite side was observed. Therefore other nerves can be paralyzed besides the seventh.

This boy got well on bromide and chloral. I think that this is pre-eminently the treatment for tetanus, except, perhaps, the toxine treatment, of which we hear so much, but which could not be practised for this case. The propriety of the treatment of tetanus by opiates is open to doubt. In the lower animals experiments show, I believe, that morphine is an exciter of the spinal cord; this is so in the frog to a marked degree. I believe that this boy got well on the bromide and chloral. During the last six months I have seen four cases of tetanus, and I would say in conclusion that, considering that such grave results may occur from such slight injuries, there should be some public provision for supplying the tetanus antitoxine, and all physicians should strive to secure such a provision. As things have been heretofore in this city it has been impossible to obtain the antitoxine for these urgent and usually rapidly fatal cases.

Dr. Wharton Sinkler: I have recently seen a case of tetanus in which the tetanus bacillus seemed to have been derived from the soil, confirming the view expressed by Dr. Willard. The patient I refer to was a victim of the morphia habit and administered to himself a number of hypodermatic injections every day. He was also greatly interested in gardening, and spent much time in cultivating his flowers. It is probable that the hypodermatic needle became contaminated with soil from his hands. I only saw him in consultation; the tetanic convulsions were extreme; trismus was marked, and the case ended fatally.

Dr. Arthur V. Meigs: What becomes of this theory in cases without discoverable cause? I had a case in my charge in which we could find no wound or point of entrance for any poison. The patient came to the Pennsylvania Hospital the second day of the disease, and died the next day. No history of injury could be obtained nor any wound discovered.

Dr. John Ashhurst: I think that the modern views and theories of the causation of tetanus are fully in accord with experience and clinical investiga-

tion. They point out the way in which tetanus is acquired, which, in former years, was attributed to other causes. The case just reported recalls the cases which were formerly known as "tetanus a frigore." It was formerly believed that the great prevalence of tetanus among troops after a battle was to be attributed to their exposure to cold upon the field and to other circumstances which would tend to lower the general health; but though this exposure might render the soldier more liable to the invasions of tetanus than if he were under better hygienic conditions, the direct cause of the disease is not the exposure to cold, but the infection of the soldier's wounds by contact with upturned soil, from the tearing up of the ground by shells and other missiles, or from the employment of the troops in throwing up earthworks, digging trenches, etc., it being known that earth is the home of the tetanus bacillus.

This also explains the occurrence of tetanus in the lower animals, and in those working among them in barnyards, etc. Tetanus is undoubtedly communicable, and its prevalence in the practice of particular veterinarians has been traced to carelessness in cleansing their instruments, which conveyed the disease directly from one animal to another.

In cases of so-called "idiopathic" tetanus, where no wound has been found, there has no doubt been some small wound, even a pin-scratch, which would give opportunity for the entrance and development of the microorganism, and perhaps even better than a larger wound, the bleeding from which would aid in washing the bacilli away.

Referring to the remark made by Dr. Lloyd in regard to the inflammation of nerves, I think that it is now generally recognized that tetanus begins as an infective form of neuritis. The least favorable cases are those in which the central nervous system is early involved, while the more favorable are those in which the manifestations are first found in the neighborhood of the wound, local spasms occurring, perhaps, for twenty-four hours before the development of trismus. These cases, therefore, I should not regard as essentially different from those of ordinary tetanus; in the slight cases the changes may be confined to the nerves in the neighborhood of the wound, but in severe cases the spinal centres quickly become implicated.

In regard to the treatment of tetanus, I am surprised that nothing has been said about the use of physostigma, which, in my judgment, is the most valuable single remedy for this disease. The first object of treatment is to diminish the sensitiveness of the central nervous system; and the second, to prevent the nerve trunks from transmitting irritation from the periphery. Opium is not of as much value in meeting the first indication as it is for the second. The method of treatment which I prefer consists, therefore, in the use of chloral and physostigma, with a small amount of opium. The physostigma is probably more important than the chloral, although this may be given in large doses. In a case in the Pennsylvania Hospital I gave for many days twenty grains of chloral every two hours, without any ill effect.

The calabar bean has also been given in large quantities; thus Holthouse gave four and a half grains of the extract of physostigma at a single dose; but a safer plan is to give one-quarter of a grain, and to repeat it every three or four hours, every hour, or even every fifteen minutes, according to the urgency of the symptoms. The chloral may be given in from ten to twenty-grain doses, and opium may be given occasionally, or may be locally applied to the wound.

Dr. Harlan: I have not heard anything in the discussion thus far with regard to the use of chloroform by inhalation. I recall a case which I saw during the war, at Fortress Monroe, of a man with tetanus, who was kept continuously under chloroform for four or five days and finally recovered. I think that no other treatment was given, and the chloroform was kept up continuously.

Dr. Joseph McFarland: I think that the statement of Dr. Willard that the tetanus bacillus is not widely distributed in the soil, and that therefore the frequent wounds inflicted by soil-bearing implements will scarcely bear out the most recent bacteriologic observations. The tetanus bacillus seems to be present in all soils upon which manure is strewn. In all probability the development of the tetanus bacillus in the body as in the soil is dependent upon the accidental presence of other organisms, for as the tetanus bacillus cannot grow where oxygen is present, some other organism near by must absorb the element before it can grow.

Sound tissue resists the tetanus bacillus in many cases, and as has been shown by Vaillard and Rouget, the tetanus bacilli are powerfully acted upon by phagocytes. These observers found that when the bacilli were introduced into the body freed from their poison, they were rapidly taken up and destroyed by the phagocytes, but that when they were introduced with an almost infinitesmal amount of tetanus toxin, or with lactic acid or some irritant which destroys the vitality of the cells, they grow and produced toxin.

The innocuousness of most of the wounds to which Dr. Willard refers are more likely due to the absence of favorable conditions, failure of the proper mixed infection, vitality of the tissue cells, presence of oxygen due to free blood-supply, etc., than to an absence of the tetanus bacillus.

Dr. Willard: In reference to the primary manifestation: in all cases the infection is probably local at first, and local spasm is the initial symptom. These cases of cephalic tetanus have been recognized as a special class, because the local spasm appears first and the general spasms later. This is partially due to the finely organized muscular development of the face, and partially to the fact that the face is always a region closely watched. The local spasm might be found in all cases if close observations were made.

When general convulsions set in they command attention, but frequently there has been no opportunity for observing the earlier symptoms. In the chronic form of tetanus the local spasm precedes general infection.

I firmly believe in earth-infection as the origin of the disease, but cannot

believe that the bacillus is at all prevalent in dirt. Undoubtedly there is in the tissues a rapid destruction of the tetanus bacillus, and for this reason the smaller the amount introduced the greater the influence of the leucocytes in preventing the entrance of the poison into the system.

With regard to Dr. Meigs's case, I do not think that it is always necessary to look for a wound, because a very slight abrasion is sufficient to permit ingress of the poison. When, as is well known, a very small quantity of this poison can produce such serious results, the wound may be so trivial as to be unnoticeable. The route of entrance of the infection in a case of tetanus is not of great consequence.

Regarding chloroform, I would state that chloroform was kept in constant readiness, but was not needed, as the boy did not have extreme convulsions.

Now, as regards the infection area: the region of the orbit and of the nose, seems to be the favorite sites. Here we have a large number of peripheral nerves and a fertile soil for infection. The German observers generally agree in the results of their work, that injury of any one of the cephalic nerves may give rise to this form of cephalic tetanus. It is very interesting here that we should have this form of local effect. I think that the facial paralysis is not due, as suggested by Klemm, to a special injury of the seventh nerve, but as a rule it is due to a toxic effect upon the nerve by infection through the general nervous system.

DOUBLE HEMIPLEGIA WITH DOUBLE HEMIANOPSIA AND LOSS OF GEOGRAPHICAL CENTRE.

By THOMAS D. DUNN, M.D.,
PHYSICIAN TO CHESTER COUNTY HOSPITAL, WEST CHESTER, PA.

[Read March 6, 1895.]

The case which especially attracted my attention to the subject treated of in this paper is a man aged sixty-eight years, married, who has led an active life. His parents lived to be nearly seventy years old. Four or five older brothers and sisters and three of his four children are living and healthy. He is not addicted to the use of alcoholic drinks, and there is no history of syphilis. He fancied a good horse, and rode and drove much.

In 1888 he was thrown from his carriage and received several severe scalp wounds, but no fracture. He was unconscious for several hours. From this accident he completely recovered, although he was very nervous for several months.

During the winter of 1890, while in Philadelphia, he had an attack of epidemic influenza, followed by pneumonia, and was then under the care of Dr. H. C. Wood. With the exception of the above, he had had no severe illness, though he frequently applied to me for attacks of acute indigestion, which always brought on violent cardiac palpitation. The pulse would become intermittent, irregular, and often 130 per minute. These attacks seldom lasted more than two days, and during the intervals the heart's action was fair. He had no dyspnœa, though there was mitral valvular disease with compensatory hypertrophy and general arterial hardening.

On the morning of May 2, 1891, he came to my office with one of these attacks. Being more comfortable in a few hours, he took a drive of eight miles to dine with a country friend. He ate a hearty dinner, and shortly afterward became unconscious.

At 8 P.M., two hours after the attack, I found there was partial paralysis of the right leg, nearly complete paralysis of the right arm, slight drawing of face, and partial right hemianæsthesia. He was unable to articulate any words except "yes" and "no." Cold applications to the head and a calomel purge were prescribed.

The following day the movements of both arm and leg were improved, but he complained bitterly of pain in the head and eyes. Much relief was obtained from bromide and cups to the back of the neck.

On the third day right lateral homonymous hemianopsia was discovered, which doubtlessly dated from the beginning of the attack. He recognized persons and objects, but could not name them; movement of the right side was much improved, and he complained less of numbness

At the end of ten days the hemiplegia had nearly disappeared, the facial expression was normal, and the hemianæsthesia scarcely perceptible; knee-jerk increased. His mind was clear and there was considerable increase in his vocabulary, but no improvement in the field of vision.

In three weeks he was walking about as usual, and his general condition was as good as before the attack. Vision remained unchanged, and there was a slight tendency to bear to the left in walking. The aphasia slowly improved, though much trouble was found in recalling the names of things. With the exception of an occasional attack of indigestion he enjoyed good health, and drove and rode as usual, though his use of names was never entirely restored, and there was no increase in the visual field.

Dr. G. E. de Schweinitz examined the patient's eyes November 24, 1891, and supplied the following report:

Vision of the right eye 20/XL, of the left eye 20/XXX. With + 3 D. 0.50 was read with each eye at thirty centimetres. The excursion of the eyes was good in all directions; there was no paresis of any of the external ocular muscle, no history of diplopia, and only slight insufficieney of the internal recti muscles with the ordinary tests.

Ophthalmoscope. Right eye: An irregularly oval optic disk, gray in its deeper layers, and bounded by a pigment crescent at the outer side; veins full and tortuous, arteries normal; general fundus in good condition and without signs of former disease.

Left eye: Irregularly oval, slightly gray, optic disk, edges a trifle prominent but clearly outlined; veins full, arteries normal; no abnormality in the retina or choroid.

Field of vision: Typical right lateral hemianopsia with contraction of the preserved fields, the relatively smaller half-field being upon the right side. The dividing-line between the preserved and the darkened fields passed, as is usual, slightly in advance of the fixing-points. (Figs. 1 and 2.) Central color-preeeption was normal.

Pupils. Contraction of the iris to light was present equally when the beam was thrown upon the blind and upon the seeing side of each retina. In other words, the hemianopic pupillary inaction was wanting, consequently the lesion whieh determined the hemianopsia was situated posterior to the primary optic centres. The pupils were round, equal in size, and the iris reactions normal in all other respects.

January 28, 1893, after eating imprudently, he had an attack of indiges-

tion, with the usual cardiac disturbance, and awakened the following morning with left hemiplegia and partial hemianæsthesia, associated with absolute blindness. Speech was not affected, but he was much worried over the loss of power in the left side and loss of sight, and he had no conception of where he was. Taste and smell were natural, voices were recognized, and his mind was only slightly affected.

FIG. 1.

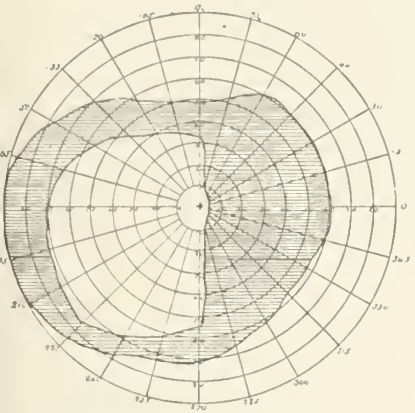
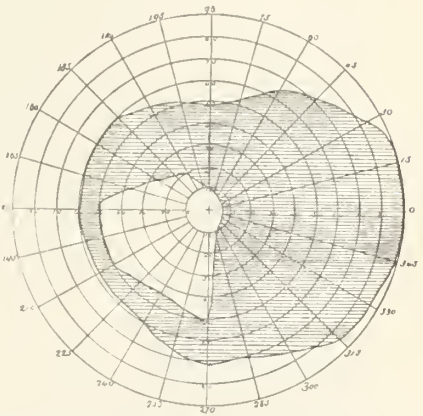


FIG. 2.



The external continuous line marks the boundary of the normal visual field, the internal continuous line the limits of the field in the case examined, the white area the region of preserved vision, the shaded area where vision was lost.

Four days afterward, as after the first attack, there was rapid restoration of power and sensibility, but no improvement in vision or knowledge of locality. His mind was clear, and he would discuss his condition intelligently.

On the eighth day he recognized light from a window, and when a candle was placed directly in front of him he saw it with each eye, but nothing could be distinguished in the room, and he could not recognize individuals except by their voices. He had much trouble in locating himself and his house—being unable to form a mental picture of any place.

At the end of four weeks power and sensibility were restored, and he could walk, when led, as well as any blind man.

With his reading-glasses, letters could be recognized at his usual reading-distance, but only the smallest words could be seen without changing the position of his head. Of the word "constantly," in ordinary reading type, he could see six letters, but not the remaining four. He could, however, read slowly by taking in small words and parts of large ones. There was no improvement in the sense of locality. He could form no conception of the geography of his own house or of any place he had ever been. He could recollect that he lived on the corner of two streets and their names, but their relation to each other, or to other streets, was completely lost. He could not

see enough of the sketches made of the floors of his own house to assist him in getting an idea of the relation of things. When a place was named he could remember it, but its location or relation to other places was lost. He could recollect individuals by their voices, and could describe correctly their appearance.

Dr. de Schweinitz examined the patient's eyes again, April 19, 1893, when the following conditions were noted:

Vision of the right eye equalled one-half, that of the left also one-half of normal. With + 3 D ordinary newspaper print (pica and small pica) could be read very slowly, one word at a time, by holding the head in such position that the word corresponded exactly with the point of fixation. If the word was long, only a portion of it could be read at a time.

Ophthalmoscope. The appearances of the optic nerve, bloodvessels, and general fundus of each eye were the same as those noted in the previous examination, save only that the grayness in the deeper layers of the disks was more manifest, and there was slight blurring of the nasal edges of the nerve-heads.

FIG. 3.

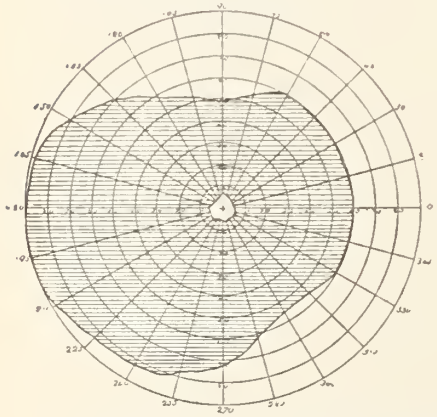
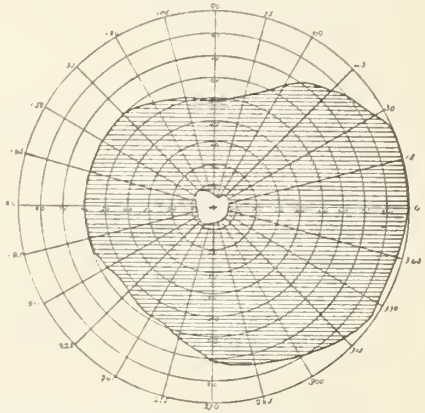


FIG. 4.



Diagrams of the visual fields after the second attack of hemianopsia. The small central white area represents the limits of the preserved field (macular vision); the shading where vision was lost.

Field of Vision. The visual field in each eye was obliterated, with the exception of a small, irregularly oval patch directly in its centre, about ten degrees in the horizontal and slightly greater in the vertical diameter. In other words, there had been added to the previous condition a left lateral hemianopsia. The preservation of this small central field in each eye indicated that the region in the cortical visual centres which supplies the macula lutea had not been destroyed—another clinical demonstration of the special representation of the macula lutea in the cortex. (Figs. 3 and 4.)

Pupils. The iris-reaction, when a beam of light was directed into the pupillary space so as to fall, if possible, on the macular region, was normal in each eye, although the response was less prompt or almost absent when the beam was thrown to either side of this position.

Color-sense. This was practically lost; red gave the sensation of "brass," green that of "gray-white," yellow was called "gold but not bright enough," and blue was described as a color that "might be purple."

In January, 1895, he had another attack of pneumonia, not extensive, from which he recovered, but with weakened heart-action and considerable dyspnœa.

It is now (March 1, 1895) over two years since the second attack of hemiplegia. There is no perceptible improvement in the field of vision; there is a small central point which can recognize a pin on the floor, but he can see only short words at ordinary reading-distance. Although he has driven over the town and walked about with an attendant almost daily, nothing has been gained of the lost sense of locality. Two points show slight improvement in this respect in his own home. After coming from a walk, if he is led to the front door and stands face inward, he can walk to a smoking-room at the opposite end of the thirty-foot hall; if, however, his face is turned outward, or even a quarter around, he cannot find his way. In his sitting-room, he fixes his position by the tick of the clock, and can find his way out of one door to a bath-room, or out of another to the hall, where the banister enables him to descend the stairs to the dining-room. The aphasia has nearly disappeared, though some words are still recalled with difficulty.

His general condition is fair, and he discusses his case with much interest and intelligence.

This case presents many points of unusual clinical interest to the ophthalmologist, neurologist, and general practitioner. Double hemiplegia with double hemianopsia is rare, and a single instance deserves a careful record. The reported cases of double hemianopsia will be briefly referred to, and thanks are due to Dr. de Schweinitz for his assistance in obtaining references.

Förster's[1] patient had a right hemianopsia, which, with the exception of a slight headache, began without cerebral symptoms. The line of division was not perpendicular, and defects were noticed both above and below the horizontal line and in the region of the macula. At first vision was one-third normal, soon it became normal, and afterward there was total

[1] Förster: Von Graefe's Arch., 1890, xxxvi. I. p. 94.

blindness. Still later a small central field was restored with one-third vision. Color-sense was lost.

The loss of recollection of locality was also a prominent feature of this case. The patient, after remaining a long time in his room, could not tell where anything was, and could not move about as well as a blind person. No positive improvement in this respect was recorded.

Schweigger's[1] case developed a sudden left hemiopic defect in September, 1888, without loss of consciousness or hemiparesis. Central vision was unchanged. In August, 1889, the right visual field failed as suddenly as the left had done before. A small central field was preserved. Unlike Förster's case, his memory and sense of locality were undisturbed.

Groenouw[2] observed left hemiplegia in a man in January, who had left homonymous hemianopsia the following April. Ten months later, after an attack of apoplexy, there was a remarkable loss in orientation. The field of vision was very narrow in all directions, but central vision was about normal. A month later there was improvement in vision, but total loss in right inferior quadrants. Color-sense not destroyed centrally. The loss in sense of locality was accounted for by the loss of recollection of optical images.

Vorster[3] has described a case of apoplexy in a man who had had an attack four years previously, with loss of sensibility of right half of body, and indefinable sensations of loss of sight. He subsequently had a third stroke, with loss of consciousness, left facial palsy and paralysis of left extremities, and total loss of sight. Eight days afterward there was a return of vision in right fields. Four weeks later he had hallucinations, and was unable to find his way about in familiar places. The left half of field was totally lost and right contracted. Four months later, vision in right was one-third; left, one-fourth; color-sense restored. Both halves defective, with the exception of central zone about fixation-point.

[1] Schweigger: Archives of Ophthalmology, 1891, vol. xx. p. 83.
[2] Groenouw: Archiv für Psych. und Nervenk., Bd. xxiii. p. 339.
[3] Vorster Allgemeine Zeitschrift f. Psychiatrie, Band xlix. p. 227.

Gaffron[1] reports a patient, aged fourteen years, who received a fracture of the skull in December, 1890, and was seen by him January 10, 1891. The fracture began six and a half centimetres above the right mastoid, five centimetres behind the ear, and extended two centimetres to the left of the median line, four centimetres above the occipital prominence. Vision was nearly lost at first, but later it improved so that the patient could go about. A small central visual field was restored, which enabled her to read small words on a large white surface.

The pupillary reaction was normal. No mention is made of loss of sense of locality. Gaffron accounted for the symptoms by the theory of a cortical lesion from the pressure of a hematoma involving the cortical visual area in the occipital lobes of both sides.

Hoche[2] (quoted by Kneis[3]) reports a very interesting case of double hemianopsia, inferior, in which there were hallucinations in the seeing field of vision, and similar phenomena in the blind. The case was only clinically observed, but the lesion was referred to the occipital lobes.

Edinger[4] (also referred to by Kneis) relates a case that was considered one of double softening of the occipital lobes. Suddenly there appeared a bright flash followed by complete blindness. This was thought to be a half blindness, the result of embolism, hemorrhage, etc., occurring alternately on either side or at the same time.

Schmidt-Rimpler's[5] case was a man aged fifty-one years who received a scalp wound in 1873. The right homonymous hemianopsia in this case was preceded by headache and paresis of the right extremities, with clonic spasms. A year later a contraction of the field was observed, followed by sudden total blindness. A small central field was subsequently restored, but later it was reduced to a minimum. No loss of the sense of location was noticed.

[1] Gaffron: Deutschmann's Beiträge zur Augenheilkunde, 1892, v. p. 59.
[2] Hoche: Arch. für Psych., xxiii.
[3] Kneis: Die Beziehungen des Sehorgans und seiner Erkrank., pp. 62 and 63.
[4] Edinger: Deutsche Zeitschr. für Nerv., i. p. 265.
[5] Schmidt-Rimpler: Archives of Ophthal., 1893, xxii. p. 313.

The autopsy showed that the right hemianopsia was due to a hematoma of the dura mater. The right paresis was the result of the extensive cicatricial contraction in the posterior central convolution.

The later loss of the left visual field he ascribes to a cheesy focus in the region between the gray and white substances in the posterior portion of the right posterior lobe.

Swanzy[1] and Werner's case was first seen several months after an attack of apoplexy. He had paralysis of left arm and right side hemianopsia. The fundus was normal, but vision was confined in each eye to the left upper quadrant, the other quadrants being wanting. No record was made of loss of orientation.

Magnus[2] reports the case of a man, aged fifty-two years, who thirteen years before had a sudden attack of left hemiparesis and left homonymous hemianopsia. Ten years after the first attack the second appeared, in which there was loss of consciousness, but no paresis. Three years after the second attack he had a third without paralysis, but there was complete blindness. After a few days he could see small objects, and when the presbyopia was corrected the small central field could recognize No. III. Snellen's test-types. He was unable to find anything in his room, and loss of memory of recent events was noticed. There was no further improvement in vision in thirteen weeks after the attack. Color-sense was normal. Nineteen weeks later there was no gain in sense of locality.

Förster[3] explains the preservation of the small central field in these cases on the hypothesis that the small portion of the occipital lobe which serves for the most acute perception, the direct vision, is supplied by the anastomosis of two or more vessels. If the main vessel which nourishes the cortex of the occipital lobe is thrombosed, and the cortex is cut off from its blood-supply, the region of most acute vision might receive its

[1] Swanzy and Werner: Trans. Oph. Soc. U. K., vol. xi. p. 183.
[2] Magnus: Deutsche med. Wochenschrift, January 25, 1894.
[3] Förster: Von Graefe's Arch., 1890, xxxvi. 1. p. 94.

blood-supply from the second vessel. He also offers this hypothesis as an explanation of the frequent deviation, in hemianopsia, of the line of demarcation toward the defective side.

The cases of bilateral hemianopsia that were at first totally blind, and in which central vision was subsequently restored, such as the Schmidt-Rimpler,[1] Vorster,[2] Gaffron,[3] and the one herein related, support the view that the macular region has a bilateral vascular supply. This view is supported by the cases with autopsies reported by Wilbrand.[4] The physiological importance of this region, the anatomical size of the macular nerve-fibre, as well as all the reported cases, are considered by Schmidt-Rimpler as supporting Förster's theory that the macular cortical region has a double vascular supply and is capable of much resistance.

In nearly all the recorded cases the absence of the hemiopic pupillary reaction was noted, which places the lesion beyond the reflex curve, either in the optic radiations or the cortical visual area.

In the absence of positive information as to the position of the lesion, much speculation might be indulged in as to the cause of all the symptoms of my patient. Only brief reference, however, will be made to a few points. In the attack of 1891, in addition to the cortical lesion causing the right hemianopsia, it must have involved the posterior portion of the internal capsule to account for the aphasia and transient right hemianæsthesia and paresis. It is not probable that a double lesion existed in the first attack, for the second attack, in 1893, was identical with the first, the only difference being that the left side was affected, and, instead of aphasia, there was loss of the sense of locality.

An embolus was probably the cause of each attack, a clot having been whipped off the roughened valve during the heart-disturbance attending the attack of acute indigestion.

[1] Schmidt-Rimpler: Archives of Ophthal., 1893, xxii. p. 313.
[2] Vorster: Allgemeine Zeitschrift f. Psychiatrie, Band xlix. p. 227.
[3] Gaffron: Deutschmann's Beiträge zur Augenheilkunde, 1892, v, p. 59.
[4] Wilbrand: Die Hemianopschien Gesichtsfeld-Formen, 1890, p. 109.

It seems that the loss of sense of locality is an important, if not a characteristic symptom of double hemianopsia. It was present in the cases reported by Förster, Grocnouw, Vorster, Magnus, and myself. Schweigger did not observe this symptom, but the hemiopic defect in his patient was incomplete.

The loss of sense of locality was not recorded in the Schmidt-Rimpler case, but he confused right and left and his memory was poor. No reference is made to the loss of locality in Swanzy's case, but a quadrant in each field was partially preserved. No mention is made of this symptom by Kneis in his brief references to Hoche and Edinger, and it was not observed in Gaffron's patient.

Grocnouw ascribes the loss of the sense of locality in double hemianopsia to the loss of recollection of optical images, which seems at least a plausible explanation. My patient, however, could recollect persons and could describe correctly their appearances. This would suggest a different place in the brain for the record of such images. The loss in my patient accompanied the second attack in 1893, when the left hemianopsia was accompanied by the left transient hemiparesis and anæsthesia. This suggests a centre (which may, for convenience, be named the geographical centre) on the right side of the brain for the record of the optical images of locality, analogous to the region of Broca for that of speech on the left side in right-handed persons.

Nearly four years have passed since the first attack of motor aphasia, transient right hemiplegia, and right hemianopsia. The hemianopsia has not improved, but the power of articulate speech has been nearly restored, as is usually the case with aphasia.

Over two years have passed since the second attack, and there has been practically no improvement in the sense of locality, except that which has been gained through the sense of hearing—for example, the ticking of the clock in the sitting-room fixing the position of two doors.

In the case of his aphasia, restoration of the power of speech

would come largely from the perceptions received through the senses of sight and hearing. His central field of vision is so limited that there is no opportunity, from the small optical images received, to conceive the relation objects bear to each other. In the absence of better reasons, this may be offered as an explanation of so little improvement in this symptom.

DISCUSSION.

Dr. de Schweinitz: Dr. Dunn's admirable report so thoroughly covers the ground that practically nothing remains to be added to what he has already said. These large diagrams, which I exhibit, give a better idea of the visual fields than the smaller ones which have been exhibited. Two points of considerable interest are suggested by their examination: First, that the loss of orientation, which has been a marked feature in fully 50 per cent. of the cases of double hemianopsia thus far reported, may be, and, indeed, has been, explained by the greatly contracted visual field, the patient being unable properly to locate landmarks within the field of vision and thus aid his judgment in forming an opinion as to his relation to his surroundings. A somewhat analogous condition of affairs is found in the restricted visual field seen in retinitis pigmentosa, although the very fact that the phenomena are not exactly alike, and sometimes not at all similar, has caused search for other explanations, which are recorded in the body of the paper. The second point of interest is the preservation of the small central field, indicating, clinically at least, that the macular region is represented in the cortex, just as we know from autopsies that other portions of the retina are thus represented (for example, Hunn's case of quadrant anopsia). As a corollary to this point, although, perhaps, not strictly germain to the present subject, is the fact that a lesion strictly localized to that portion of the cortical area representing the macular region would be manifest by a central scotoma in the visual field. I would suggest that this point has not received the attention which it deserves, and that in our investigation of central scotomata hereafter, unexplained by evident lesion within the eye or the optic nerve itself, the possibility of central disease thus located should be taken into consideration.

Dr. Joseph Leidy: The Fellows of the College may remember a very interesting specimen which I presented to the American Neurological Society, of thrombosis of the circle of Willis. The case was brought to the Pennsylvania Hospital with a right hemiplegia and hemianopsia. The patient had

about recovered when he had another stroke, affecting *the opposite side*, which caused his death. I attributed his improvement to absorption of the clot and to an anomalous distribution of the vessels of the circle of Willis. I do not know whether there would have been hemianopsia upon the opposite side, if he had survived; but death terminated further observation. It is of interest to note the location of the lesions in the circle of Willis, as occasioning his symptom, namely, thrombi in the middle and posterior cerebral arteries.

Dr. Sinkler: I am much indebted to Dr Dunn for this very valuable report. The explanation of the case seems to me that both attacks were due to embolism. From the fact that he had hemianæsthesia as well as hemiplegia, I think that the lesion was situated in the posterior part of the internal capsule, because we know that a lesion here will affect both motor and sensory fibres going to the cortex, as well as those going to the cuneus.

This case is interesting from the fact of the rarity of double hemiplegia and anæsthesia, and is especially remarkable in that hemianopsia should have been associated with each attack.

A CASE OF ACUTE ŒDEMA OF THE LARYNX IN WHICH RECOVERY FOLLOWED TRACHEOTOMY.

By H. R. WHARTON, M.D.,
SURGEON TO THE PRESBYTERIAN, CHILDREN'S, AND METHODIST HOSPITALS.

[Read April 3, 1895.]

On the evening of December 28, 1894, I saw, in consultation with Drs. J. J. Black and R. R. Tybout, of New Castle, Del., J. S., aged twenty-five years, who was first seen by Dr. Tybout on the evening of December 27th, when he complained of some soreness of the throat. When Dr. Tybout first saw him he stated that the man had a temperature of 101°, the respirations numbering 20 to the minute, and upon inspection of the throat he found some inflammation of the tonsils and some injection of the veins of the pharynx; the patient also complained of slight difficulty in breathing. Dr. Tybout was called to see the patient again early next morning, and found him sitting up, very restless and presenting marked symptoms of dyspnœa. An examination of the throat at this time showed some inflammation of the tonsils and a swollen œdematous condition of the epiglottis. The dyspnœa persisted through the day, was occasionally much aggravated, and there was at times an expectoration of muco-purulent matter, and by evening cyanosis of the face was well marked.

When I saw the patient on the evening of December 28th, about 11 o'clock, I found him sitting in a chair, presenting marked symptoms of dyspnœa; his expression was anxious, the voice was suppressed, respiration was noisy, due to rattling of secretion in the trachea; the face was cyanosed, and there was occasionally expectorated with great difficulty a thick gelatinous muco-purulent secretion; there was dulness over the posterior portion of both lungs, and auscultation showed that air entered the lungs, but the respiratory sounds were obscured on account of the transmission of the sounds from the trachea. The patient's temperature was 101° and the pulse was 130. Upon examination of the throat I found the tonsils moderately swollen and the pharynx injected; the epiglottis was very much swollen and œdematous, presenting a tumor of the size and shape of a horse-chestnut, its

cartilaginous outline being entirely masked by the swelling. A mouth-gag was introduced, and the epiglottis was freely incised. This procedure was followed by the escape of a considerable quantity of dark-colored blood, and there was coughed up a quantity of thick, blood-stained muco-purulent matter. The man experienced marked relief from his dyspnœa after the incisions had been made, and, after waiting for half an hour, the epiglottis was again incised, and upon examination it was found that swelling of the epiglottis had diminished so much that the cartilaginous outline could be felt with the finger. After waiting for an hour it was noticed that the dyspnœa was again becoming more marked, and the cyanosis was also increasing. The temperature at this time was 101°, the pulse 140. After consultation with Dr. Black and Dr. Tybout it was decided that it would be wiser to open the trachea, and the patient was placed upon a bed and a few drops of a 2 per cent. solution of cocaine were injected into the cellular tissue of the neck over the lower portion of the trachea; the trachea was then exposed and opened below the isthmus of the thyroid gland, and a No. 5 tracheotomy tube was introduced. As soon as the trachea had been opened the patient expectorated through the wound a large quantity of blood-stained muco-purulent matter, the blood-staining being evidently due to leakage from the previous incisions in the epiglottis; this secretion was so thick that it lodged in the inner canula of the tracheotomy tube, and to clear this it was necessary to remove the inuer tube and use a feather. The patient's dyspnœa was entirely relieved on the introduction of the tracheotomy tube, and he breathed quite comfortably so long as the tube was kept free from the secretion, and he was able to rest in the recumbent posture. Breathing was comfortably carried on after the operation, and, although the man was quite ill for forty-eight hours, and continued to cough up large quantities of muco-purulent matter, after this time he improved rapidly.

After the operation the case was most judiciously treated by Drs. Black and Tybout, the treatment consisting largely in the use of strychnine hypodermatically, quinine, and stimulants. I saw the patient again at the expiration of a week, and at that time the temperature was normal and the pulse 80. The profuse expectoration through the tube had ceased, and there was then only a moderate amount of glairy tracheal mucus coughed up. At this time I changed the tracheal tube and introduced a new one, and after this Dr. Tybout changed the tube again in a few hours, as it was not so comfortable as the previous tube. The tracheotomy tube was finally removed on the nineteenth day, and the wound was healed four weeks after the operation.

Œdema of the glottis is a term that the older writers employed to designate a disease of the larynx that was characterized by a serous infiltration of the submucous tissue of the larynx. The condition is probably better named by modern

writers as acute œdematous laryngitis, phlegmonous laryngitis, or acute œdema of the larynx. Mackenzie attributes this form of disease to septic influences, and Massie and Fasano believe that these cases are really examples of erysipelas of the larynx, claiming that the presence of Fehleisen's micrococcus has actually been demonstrated in this condition. Acute œdema of the larynx may occur as an apparently primary affection, or may follow an attack of acute pharyngitis or tonsillitis, but rarely follows acute catarrhal laryngitis, and the affection seldom terminates in the formation of an abscess. Sestiér found in 158 cases of œdema of the larynx that 36 were primary and 122 were secondary. The occurrence of œdema of the larynx quite independently of any inflammatory process has been pointed out by Ziemssen;[1] it is likely to occur as a result of general dropsy from disease of the kidneys, heart, or lungs, or from circumscribed obstruction of the laryngeal veins through compression of the superior or inferior thyroid veins, the facial veins, inferior jugular or innominate veins; by swelling of the lymphatic or salivary glands, enlargement of the thyroid glands, new growths in the neck or aneurisms. Acute œdema of the larynx may also have a traumatic origin, and may arise from the inhalation of hot air or steam, or the swallowing of irritant poisons or caustics, such as strong ammonia or concentrated lye. The affection is rarely seen in children, unless it be of traumatic origin, and it is more frequently seen in men than in women. Acute œdema of the larynx seems more liable to occur in persons whose general health is below par, upon exposure to cold and dampness. In the case I have reported the patient previous to the attack was in good health, but had been exposed to cold, and the development of the œdema of the larynx was preceded by tonsillitis and pharyngitis of moderate severity. Lennox Browne states that œdema of the epiglottis is especially marked when a laryngeal inflammation follows a pharyngitis. The œdema is not confined to the connective tissues of the supraglottic region,

[1] Cyclopædia of Medicine, vol. vii., 1876-77.

but in many cases extends downward and causes infiltration of the submucosa below the cords, a fact that explains why temporary relief of the dyspnœa is often obtained by scarifying the epiglottis and vocal cords, and dyspnœa later develops, which requires further operative treatment for its relief.

The symptoms of œdema of the glottis are suppression of the voice, stridulous respiration, the difficulty being at first most marked in inspiration; later the expiratory act is also embarrassed, cough is present, and is usually unaccompanied by expectoration, and is often painful; deglutition is difficult and painful. Combined with these symptoms when the affection is well developed, the patient is restless and cannot remain any considerable time in the recumbent posture, sits up or walks about; the extraordinary muscles of respiration are brought into play, the lips become cyanosed, the eyeballs become prominent, and the patient exhibits a most anxious expression of countenance, presenting all the symptoms that the Germans well describe as those of "air-hunger," so familiar to those who see urgent cases of obstructive dyspnœa. In mild cases of œdema of the larynx the use of saline cathartics is indicated, and Lennox Browne recommends highly the use of pilocarpine hypodermatically in doses of $\frac{1}{12}$ to $\frac{1}{4}$ of a grain, and the inhalation of warm vapors. As soon as the œdema is well developed scarification of the œdematous tissue should be practised, and should be repeated if, after temporary relief, the dyspnœa returns. The pilocarpine injections and the inhalation of warm vapors should also be employed after the scarification has been practised. If, after repeated scarifications, dyspnœa is still present tracheotomy should be promptly resorted to, and the trachea should be opened at as low a point as possible, for the œdematous process may involve the mucous membrane of the upper portion of the trachea; the relief of the dyspnœa after tracheotomy is usually complete.

I am not aware that intubation of the larynx has been practised to any extent for the relief of dyspnœa in cases of acute œdema of the larynx. In cases in which the epiglottis is much involved I do not think that the intubation tube would be of

any serviee, but its introduetion might be of use in eases of subglottic œdema.

The treatment of cases after tracheotomy has been performed consists in keeping the patient in a warm room, the air of whieh is kept moist by the use of a steam spray, and the tracheotomy tube should be kept thoroughly cleaned. If the patient does well, the traeheotomy tube ean usually be dispensed with at the end of ten days or two weeks.

The prognosis, as might be expeeted, is more favorable in cases of aeute primary œdema of the larynx than in cases of seeondary œdema. Sestiér[1] reports 213 eases, both aeute and seeondary, 158 of whieh were fatal. Gross reports 132 eases of œdema of the larynx in which ordinary treatment was resorted to, of whieh 104 terminated fatally; 36 eases were subjeeted to tracheotomy, 13 reeovered and 23 died.

DISCUSSION.

Dr. R. P. Harris: A similar case was reported to the Academy of Medieine of New York about forty years ago. It was one of the most remarkable eases on reeord of this eondition. Dr. Morris, of Morrisania, had the ease, and sent for Dr. Gurdon Buek in consultation. The patient was apparently dead when Dr. Buck arrived. He did a tracheotomy and put in a tube, and practised artificial respirations. He also scarified the epiglottis. He left the patient in half an hour breathing naturally, and I saw the patient some three weeks later as well as ever. This was the nearest ease to death I have seen from this cause which recovered. It resembles more the drowning cases which have been restored by this process.

[1] Sestiér: Traité de l'angine laryngée édémateuse.

SYNOPSIS OF A PAPER ON A CLINICAL STUDY OF CASES OF PERSISTENT ABSENCE OF THE GASTRIC SECRETORY FUNCTION.

By D. D. STEWART, M.D.,
LECTURER ON MEDICINE IN THE JEFFERSON MEDICAL COLLEGE; DIRECTOR OF THE STETSON CLINICAL RESEARCH LABORATORY, ETC.

[Read April 3, 1895.]

The paper, after briefly reviewing what is known from necropsies as to atrophy of the gastric tubules, its relation to pernicious anæmia and the like—a relation first suggested by Flint, and afterward fully described by Fenwick—cites literature of more recent cases, the clinical diagnosis of which was possible by the aid of modern methods of research. Gratitude is expressed to Leube for the introduction of these, that made such a diagnosis possible, and to Javorski, whose method of stimulating the indolent secretory follicles in cases of fictitious atrophy has allowed of the certain diagnosis of arrested secretory function, although it does not at once permit the pathological diagnosis, that of atrophy. It is shown that this last and the separation of curable cases of neurosal inhibition from those of true atrophy can be made clinically with great positiveness after a time. This separation is arrived at by the long and steady duration of the secretory loss and total lack of response to treatment to provoke return, in face of complete restoration to function of the coincident disturbed motility—the actual cause of most of the symptoms, direct and remote, of the affection. The separation from latent gastric carcinoma, especially from the infiltrating form, is

made by the absence of cachexia, of wasting, by the duration of the case, and if atony prevail, as is common, by the presence of marked and persistent lactic-acid production. It is pointed out that in gastric carcinoma, save in its terminal stage, as also in chronic gastritis, although free HCl is absent, and the gastric secretion after a trial-meal shows no digestive activity, a fair amount of pepsin and rennin may be readily extracted from the tubules by Javorski's method, unlike what is the case in primary atrophy of the tubules. These ferments have existed in the formative or potential stage as proenzymes, and needed but the stimulating influence of HCl, under certain favorable conditions, for their conversion into active digestants easily recognizable. In these cases of carcinoma, and in cases of chronic gastritis where there is doubt as to diagnosis, it is shown that the amount of acidity, the presence of indications of bound HCl, and of certain fermentative changes in the filtrate, greatly assist in diagnosis from atrophy, as does also the appearance in the wash-water of shreds of mucous membrane and always of epithelial cells; these, and in cancer, sometimes, cell-nests or small pieces of the growth, assist in the exclusion of atrophy of the gastric tubules, especially as a primary affection. The acidity of the removed contents in cases of primary arrest of gastric secretion is always very low, and consists, save in exceptional instances, only of that of the food eaten, as I show by experiment.

Three cases are here described. These are of especial interest, occurring as they do as an idiopathic affection, unlike many cases described by Reichmann, Javorski, and many others, in which there was often antecedent history of chronic gastritis or the presence of carcinoma.

I have followed these cases for several years; two for nearly three years; the other for over four years. One, the most instructive, first came under observation with symptoms of chronic arthritis, due to the deposit of urates in the joints, as was shown by the presence of certain symptoms and a careful study of the urine over a long period. She was an invalid—chair-ridden. Gastric symptoms were practically

absent. Symptoms of renal fibrosis were evident, and were regarded as in the early stage. Marked atony of the stomach existed, and, as in all the cases I describe, total and continuous absence of secretion of gastric juice—of HCl, of pepsin, and of the milk-curdling ferment.

The second case presented herself for treatment with symptoms of grave anæmia, which had recurred in attacks of months in duration for several years. With these symptoms were those indicative of the condition described by our President as cardiac asthenia. Gastric symptoms were in the background. Neither of these cases showed the slightest indication of a neurosis. One is in middle life; the second is aged thirty-five years. The third case, also a woman, aged thirty-three years, is a typical neurotic. In this case more doubt has all along existed as to the condition underlying the absent secretory function. I feel that I may now say concerning it that, although its origin may be regarded as neurosal, its long and steady continuance over an observed period of four years is very suggestive of atrophy of the tubules.

In the first two of the cases a complete removal of all symptoms occurred under treatment directed to re-establishing secretion, in all probability through it equally influencing the impaired motility. The treatment consisted chiefly in the use of the hot stomach douche, intra-gastric electricity, and of large doses of HCl. In the other cases the douches and intra-gastric electricity could not be employed. In the second the free use of HCl and intestinal disinfectants seemed mainly the cause of the improvement. Both of these cases have been in perfect health for over a year, have gained largely in weight (both weigh more now than ever before), and eat and digest without discomfort, like ordinary normal individuals, although no secretion of gastric juice ever occurs. Digestion, of course, goes on in the bowels by the aid of the pancreatic secretion. It is here pointed out that the conduct of these and similar cases clearly establishes the truth of Bernard's belief that the stomach, even under the most favorable conditions, can be regarded as little more than a reservoir for food and as a conduit to the duod-

enum, where perfect digestion occurs. They certainly prove that the secretory function is secondary in importance to that of motility. Recent experiments of Kühne and Chittenden have shown that even under the most favorable circumstances true peptonization occurs only to a limited extent in the stomach, and that gastric digestion is but a preliminary stage to more perfect intestinal proteolysis. But on account of the almost certain likelihood in the great majority of cases of absent gastric secretion, as in other affections of the stomach characterized by mere diminution of the same, of coincident involvement of motility, thus originating atony and its train of ills, loss of secretory function must be viewed with great gravity. Hence Meyer believes that these cases, whether secondary or idiopathic, rarely last more than a few months to two or three years.

The third of my cases is a chlorotic woman, in whom a decided neurotic element has rendered her less susceptible to general improvement. She had had epileptoid seizures for several years before she came under observation. She would submit to the tube only for diagnostic purposes, and even then with reluctance, its employment often causing a hysteroidal seizure. The douche and the use of intragastric electricity could not be employed for these reasons. Her nutrition is now always fair, and at times very good. Gastric symptoms of the sort described by Boas and others did not occur at all in Case I. and were slight in Case II. Case III. had the characteristic vomiting and pain after meals. These were removed by the free employment of HCl, and do not recur on its continuance. She has voluntarily continued it quite steadily in large doses for four years.

In none of the three is there gastrectasia, a symptom regarded as common by Meyer and others.

In the first and second cases the origin of the secretory loss is most obscure; in the third a neurotic element is so prominent that it may be regarded as the source of the disorder. In the others none exists. In origin all of these cases may have been those of neurosal suppression of secretion—inhi-

bition arising through some long-continued reflex irritation not now evident. Whatever the primary determining cause may have been, the long duration of the affection, with perfect restoration of motility in the face, in two, of complete, and thus far permanent restoration to health, renders the continued absence of gastric secretion of great significance and grave omen. For because of the functions of secretion and motility being, as they are, so intimately connected by innervation through the vagus and sympathetic, it is reasonable to suppose that complete restoration of impaired nerve functioning in one, as in restored motility, would, after so long a time in which restoration has continued, lead to at least partial return of secretory power. This should especially be were the trouble merely functional, when treatment as successful in restoring secretion in other gastric affections has here been long tried resultlessly. I state that these cases in origin may have been, through causes not apparent in at least two, those of neurosal suppression of secretion, and have arisen through long-continued reflected disturbance in gastric innervation, impairing jointly motility and secretion. I regard in this particular a suggestion of Stockton's as especially worthy of attention. He asks if we may not have to do here with an affection which at the start is functional merely, but the long-continued inhibition of glands is succeeded by atrophy. This had been my own thought, although I am unable to accept his evident preference for eye-strain as the source of reflected irritation. In every case observed by him, curiously, a very similar condition of high refractive error existed in all—unsymmetrical astigmatism of high degree, varying from 1 to 5 D. There also was noted, in all, irregular ametropia, myopia in one eye, hyperopia in the other, with a lack of correspondence in the axes of astigmatism. It is interesting that the one case (the neurotic) in which such errors would be more operative has practically no eye-strain. Apart from a low hyperopia the eyes were quite normal. In Case I. some refractive error existed, but not of the pronounced character noted in Stockton's cases. She is a woman of strong will and sound nervous organiza-

tion, one little likely to be affected by such a reflected condition as is present. In Case II. less refractive error was found than in Case I.—too slight error, according to Dr. Gould, to cause any serious reflex. Inquiry of Dr. Einhorn as to the condition of refraction in his four cases elicited the response that no refractive trouble was found to exist in two of the four. A third is crossed-eye. No examination had yet been made in the fourth at the date of Dr. Einhorn's letter.

As concerns therapy, I point out that it is practically useless, after long trial, to hope to restore secretory activity, although, since the same remedies are applicable to maintain the motor function, they may be resorted to for periods of a few weeks or months from time to time. The remedies most useful are those influencing motility, obviating stagnation, and maintaining good motor power when re-established. The chief of these remedies, incomparably superior to all others, is the intragastric use of electricity, contrasted with which drugs, such as strychnine, are as nothing. As the use of HCl, which favors secretory return, seems also to influence the impaired motility, it may also be employed. HCl is more especially indicated when the case first comes under observation and doubt exists as to the pathological condition underlying the absent secretory function. It should then be used for months at a time. It must be employed in rather large doses, such as from 4 to 8 c.cm. (℥j to ℥ij) of the dilute acid, and for best effect as a secretory stimulant should be given before meals. I give it in this amount in decinormal solution (0.364 per cent. absolute HCl), preferably introducing it through a soft stomach-tube, which the patient enters to the first part of the œsophagus. Even in one unaccustomed to the tube and prejudiced to its employment, so little discomfort after a trial or two is experienced by its introduction only thus far, especially if cocaine is first used for a few times, that it is in nearly all cases willingly resorted to. Thus is avoided the disagreeable taste and the effects upon the teeth of the large volume of acid necessary in these cases.

I point out in my paper that artificial digestants are rarely

required in these cases. What is essential is attention to the motor function. I state that if for any reason digestion is regarded as imperfect in the bowel, through coincident failure of pancreative secretion, certain digestive agents are of use for a time. Should failure of a good digestive secretion on the part of the pancreas be permanent, nothing then can, of course, hope to avail for more than a short time. The administration of HCl or of HCl and pepsin as digestants, for obvious reasons, fully considered, are utterly unphysiological. HCl alone can, of course, be of no utility, unlike the case in gastric catarrh or in simple nervous depression of secretion. Secretion of pepsin cannot be hoped to be stimulated by it from glands long the seat of atrophy. With pepsin it is also inutile, as sufficient cannot conveniently be constantly taken to saturate completely the albuminoids and salts of the food after a moderately large meal. I adduce experiments to support this, and also cite the interesting experiments of Blum (recently quoted by Chittenden in his Cartwright lectures), who shows that with a daily consumption of 100 grammes of proteid, a fair average, there would be required no less that 4½ litres of 0.2 per cent. of HCl daily, and even this would not suffice to give free acid. I point out that the only physiological digestant in these cases is a pancreatic preparation, or one of the vegetable digestants, papain or pineapple juice.

A CASE OF RUPTURED UTERUS, WITH OPERATION AND RECOVERY.

By ISAAC MASSEY, M.D.,
PHYSICIAN TO THE CHESTER COUNTY HOSPITAL, WEST CHESTER, PA.

[Read April 3, 1895.]

Sarah E. R., colored, aged thirty-six years, has always been a strong, robust woman, and is the mother of six children. The first child was born eleven years ago after a perfectly natural labor. About one and a half years afterward her second child was born—dead—after a difficult labor lasting two days. The child was large, and she had been working very hard for some time before. The third labor was short and natural, and a living child was born. The fourth labor was natural, but the child was born dead. During the time she was pregnant with this child she also worked very hard. The fifth labor was normal, and a living child was born. The sixth labor began at 12.30 Monday night. The pains were regular and strong, and lasted until about 5 o'clock, when they stopped entirely. She does not know of any pain being particularly severe or long; was in bed all the time, and had no pain from 5.30 to 8 A.M., when her physician, Dr. Patrick, arrived. The bag of waters broke at 6 A.M., and there seemed to be an unusually large amount of fluid—at no time was there much hemorrhage. When Dr. Patrick made an examination he found the head well down in the vagina, and applied the forceps, but was unable to effect a delivery. The forceps were removed, and a short time afterward, on attempting to reapply them, the head had entirely disappeared from the vagina, and could not be felt by the finger, but an opening was found in the upper right vaginal sulcus.

The nature of the trouble was recognized at once. The vagina was packed with iodoform gauze, and the patient brought in an ambulance about two miles to the Chester County Hospital. With the assistance of Dr. Hoskins a laparotomy was performed at once. A large male child was delivered through the abdominal incision. The placenta was found detached from the uterus, both placenta and child having escaped into the abdominal cavity. The uterus was fairly contracted, and there had been but

ittle hemorrhage. A tear about four inches in length was found in the lower portion of the uterus on the right side, extending from a point four inches above the cervix, through the cervix and involving a portion of the vaginal vault.

The tear was stitched with fine silk sutures. The abdominal cavity was thoroughly washed out with boiled water, and then sewed up. No drainage was used. She made an uninterrupted recovery.

On January 31st, sixteen days after the operation, she had an attack of acute muscular rheumatism. Her temperature was $101\frac{4}{5}°$ at 6 P.M.; on February 2d it reached $104\frac{2}{5}°$, but rapidly yielded on administering anti-rheumatic remedies.

She is now entirely well and able to attend to her household duties.

An interesting feature of this case is the presence of numerous large keloid growths over the breast and shoulders, which she attributes to a whipping given by her father.

DISCUSSION.

Dr. R. P. Harris: I know of but two cases on record in which this operation saved the life of the patients.

OVARIECTOMY IN SHANGHAI, CHINA; TUMOR ONE HUNDRED AND EIGHTY-TWO AND ONE-HALF POUNDS.

By ROBERT P. HARRIS, M.D.

[Presented April 3, 1895.]

I PRESENT four photographs of a little Chinese woman, 4 feet 8 inches high, showing her appearance before and after the removal of an ovarian cystoma that contained more fluid than has been found in any diseased ovary exsected with success. One heavier tumor has been removed, but it was largely composed of solid material, the fluid contents being less by 70 pints than in this Chinese subject.

These photographs were sent for to Shanghai with an understanding that I intended to place them in the showcase of the library of the College of Physicians; and the request was made to me that the operator's name should not be paraded in the case. So I have compromised the matter by placing her name, with a short description of the case, on the backs of the two pictures taken prior to the operation.

As the operator has not yet reported the case, which I have urged her to do, I do not feel at liberty to say more than has been put upon the cards. The operation took place on November 1, 1894, at the Margaret Williamson Hospital, West Gate, Shanghai, and was performed by Dr. Reifsnyder, a missionary physician and a graduate of the Woman's Medical College of Philadelphia. Ovarian cystomata are not uncommon in China, and as there is no tapping by native doctors the tumors are allowed to grow until they kill the women, except in the few instances where they have been removed by a foreign operator. Dr. Reifsnyder has operated several times, but this was the largest tumor removed.[1]

The cystoma in question was a growth of the left ovary, and had been enlarging for six years. The ordinary weight of the little woman was about 90 pounds; she was married, sterile, and aged twenty-five years. Her

[1] She has reported the case, since the above was written, in the American Journal of Obstetrics for April.

largest girth was 5 feet 9⅛ inches, and the measure over the tumor, from ensiform cartilage to pubes, was 39 inches. The cyst contained 22 gallons, or 176 pints, and the sac proper weighed only 6½ pounds. The weight of the tumor may be estimated at 182½ pounds. The woman made a good recovery.

A larger ovarian tumor, but more than half solid, was removed with success by Dr. Maritan, of Marseilles, probably in 1892. The woman weighed 337 pounds, and the tumor 200 pounds 14 ounces. Girth over tumor, 6 feet 5$\frac{13}{16}$ inches. Fluid contents of tumor, 105$\frac{6}{16}$ pints; solid portion, 95 pounds. Wound, 23$\frac{12}{16}$ inches long; sutures, 100. Adhesions numerous. After recovery the woman weighed 138 pounds.—*Gazette Méd. de Paris*, January 14, 1893, p. 22.

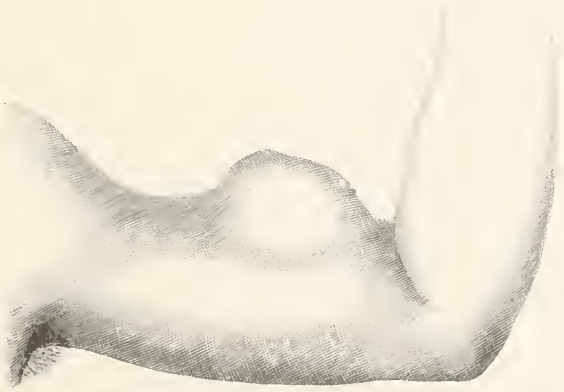
RUPTURE OF THE LONG TENDON OF THE BICEPS BRACHII MUSCLE ASSOCIATED WITH RHEUMATOID ARTHRITIS.

By GWILYM G. DAVIS, M.D., M.R.C.S.,
SURGEON TO THE GERMAN AND ST. JOSEPH'S HOSPITALS.

[Read and Patients Exhibited, May 1, 1895.]

Recently two cases of rupture of the long tendon of the biceps muscle of the arm came under my notice which are of interest to physicians as well as to surgeons. Their histories are as follows:

The first case, a laboring man, aged thirty-seven years, has had pain in the left hip and leg and right shoulder-joint for the past six weeks. The trouble in the hip and leg was painful and annoying, but has improved somewhat.



The pain in the shoulder, on the contrary, has been very marked, and so disabled him as to cause him to apply for treatment; he has but little power in the arm. Six days ago he noticed a lump on his right arm which became

more marked when the elbow was flexed. He states that he has no knowledge of having strained the arm in any way, and is not able to connect the appearance of the lump with any muscular effort. On examining the shoulder it appears somewhat atrophied, and distinct grating can be felt and heard when the head of the humerus is rotated. On contracting the biceps muscle and flexing the elbow a marked lump occurs instead of the gentle swell of an intact muscle. It is evidently composed of that portion of the biceps attached to the long tendon. The unaffected portion of the muscle attached to the short tendon can readily be seen and felt to its inner side. The upper portion of the lump diminishes in a fusiform manner into the long tendon, which can be felt as a rounded cord disappearing in the axilla beneath the edge of the deltoid muscle. The shape of the enlargement varies according to the amount of the contraction of the muscle. The accompanying sketch shows its customary appearance. (See figure.)

The second case occurred in a blacksmith, aged sixty years. When twenty-five years of age he had an attack of rheumatism, which began in the feet and then involved the knees and hips. He was confined to bed for four or five weeks. At this time his arms were not affected; nine months ago he was seized with pain in the right shoulder, which was so severe as to prevent him from sleeping and deprive him of all use of the arm, so he stopped work, and has done none since. The pain lasted two months, and during this time there was nothing unusual seen about the arm. Four months ago, while under the care of Dr. Goodman, he noticed a lump on his right arm above the flexure of the elbow. This came without his knowledge, and did not supervene on any violent exertion. On examining him the shoulder-muscles are seen to be atrophied, and the lump is evidently the long belly of the biceps muscle. Its upper portion can readily be felt to be prolonged into the long tendon which disappears under the edge of the deltoid. The creaking and grating in the shoulder-joint have now almost disappeared, although they have been present; the pain, though lessened, has not entirely disappeared. The power of the arm is much weakened, though he can flex and extend it readily, Yesterday he drew my attention to his left knee, complaining of pain in it; examination revealed a tumor three-quarters of an inch in size at the upper and outer border of the patella. It seems at times to move independently of the patella, but is evidently quite closely connected to it and in all probability is one of the fibro-cartilaginous growths which occur in the fibrous structures in the neighborhood of joints in those affected with this disease.

Cases like these may come under the notice of either a physician or a surgeon. When the disease is somewhat obscure in its manifestations, particularly in its early stages, and when several joints are affected, then the patient, thinking he has rheumatism, is apt to apply for treatment to a physician; when, however, the affection has the local symptoms marked,

particularly if in a single joint, then he is apt, as did these two patients, to apply to a surgeon.

Rupture of one of the tendons of the biceps muscle is not particularly uncommon; four of such cases have come under my notice. Three were of the long tendon and one of the tendon of insertion at the bend of the elbow. It is apt to occur either suddenly from violent exertion or the condition may only be made known by the finding of an unusual lump at the seat of the muscular swell of the biceps in a patient suffering from disease of the shoulder-joint.

The tensile strength of healthy tendon is so great that it is my belief that true rupture is much rarer than is usually supposed, and that when a tendon does rupture it is very likely to be diseased. Some cases which result from violent muscular contraction are, in reality, tearing loose of tendons from the muscular or bony tissue. One of the four cases I have seen was of that character. The patient was a young man, an athelete, who, while warding off a blow in sparring, felt a pain in the tendon of insertion of the biceps above the elbow, with loss of power in the arm. Dr. Henry Beates, under whose care he was, stated that the belly of the muscle was drawn up while the tendinous lower end could be distinctly felt with the fingers lying beneath the skin to the inner side of its normal position. By gentle manipulation he was able to bring it opposite to the upper end, which was also gently pressed down into position, and by means of a suitable dressing retained in place. I saw the patient many months after, when union had occurred, and he had such good functional results that he ventured again to put on the gloves. The cause of the rupture occurring in this patient was undoubtedly due to the pathological condition of his muscle, because he was at the time of the injury muscle-bound, and had been for some time. Had the tendon itself been ruptured its lower piece would have been too short to be manipulated as it was. Rupture of tendons occurs in children with extreme rarity, their tissues not being the seat of the degenerative changes of later life.

Bryant (*Surgery*, vol. ii.) gives the case of a boy, aged eight

years, with rupture of the biceps femoris tendon at the point of its insertion into the fibula. Here again it is the point of junction of the tendon with the part to which it is attached that is involved, and not the tendon itself.

The cause of rupture of tendons is usually their being weakened by the disease variously known as rheumatoid arthritis, arthritis deformans, rheumatic gout, osteo-arthritis, etc. Robert Adams, to whom we are indebted for our most accurate knowledge of this disease, in his work on *Rheumatoid Arthritis*, 1873, describes (p. 97) the condition which it produces as follows: "Should we have an opportunity of examining the anatomical conditions of the tendons in and immediately around the shoulder-joint in any case in which the disease had existed in an early stage, we shall find that these structures resemble tendons which had been for a long time macerating, and that they have their fibres widely separated from each other, as if they were about to resolve themselves into their primitive elements." P. 98: "As to the tendon of the biceps, except in those cases in which an opportunity is afforded to us of examining a shoulder-joint in which the disease is in an early stage, we usually observe that the whole of the intra-articular portion of it has been removed. The remains of the portion of the tendon of the biceps external to the capsule will be found to have contracted firm adhesions to the summit and edges of the bicipital groove."

Rheumatoid arthritis is not a rapidly fatal disease, and just as Mr. Adams, as quoted above, attributes absorption of the biceps tendon to a late stage of the disease, so likewise do his successors. That the tendon does rupture, and does become absorbed, is alluded to and well recognized by some writers, although many descriptions of this disease in medical works fail to make reference to it; but they universally associate it with more or less disorganization of the joint, and cause it to be considered as a late phenomenon in the progress of the affection. The contrary is true. It is apt to be a comparatively early symptom. Long before the marked change occurs which one sees in the familiar illustrations in the text-books

the continuity of the tendon may be destroyed. In the first case, of which the history is here given, the disease had only been present for five weeks when the rupture occurred, and that, too, without the patient being cognizant of it, thus showing that the solution must have been nearly or quite complete. In the second case the disease had existed only five months when the rupture occurred. This is comparatively early considering that it is a disease which lasts for many years. In both patients the disorganization of the joint could not have been so very extensive considering the slight restriction of motion which existed. In some cases the affection seems to be one of the interior rather than the exterior of the joint, and the changes proceed outward. One can readily see why the biceps tendon lying inside of the capsule, and only separated from the main joint cavity by a synovial sheath, should be early affected and destroyed.

The line separating cases of rupture due to violence from those due mainly to disease is not always so sharply marked as the three cases already given would seem to indicate. This is shown by the fourth case, which I saw some years ago. It occurred in a man advanced in years, and supervened on some violent exertion. He was, however, the subject of rheumatoid arthritis, and it is likely that in his case the tendon had been somewhat weakened and partly absorbed by the disease, so that when the violent contraction of the biceps occurred it caused the weakened tendon to break. Is it not possible that the fibrous and tendinous insertion of muscles, particularly those which insert close to the articulations, may become affected by rheumatoid disease and so weakened as to cause their rupture without other appreciable signs of the disease? I am inclined to think so.

Bryant (*Surgery*, vol. ii. p. 292) says: "When one tendon breaks the other usually follows at a later date, thereby clearly indicating that they give way from some disease which affects their elasticity." Dr. J. Roberts Bryan informs me that he had a patient advanced in years who sustained a rupture of the quadriceps tendon just above one patella, which was fol-

lowed several months later by rupture of the tendon of the opposite side at the same place, yet no other evidences of rheumatoid disease were present. If it is a fact that such cases are due to a weakening of the tendon by rheumatoid disease, it indicates the desirability of advising the patient to guard against any sudden, violent muscular efforts, and may give us some clue to a correct prognosis as to the future course of the affection.

E. Pagenstecher, in the *Berliner klinische Wochenschrift*, of April 22d, just received, gives two cases of rupture of the biceps muscle, one occurring in a strong muscular man while lifting a quarter of beef, and the other in an athlete. The histories are not complete enough to judge as to the causes favoring their occurrence.

DISCUSSION.

Dr. John Ashhurst, Jr.: It is well known that the conditions which are ordinarily spoken of as rupture or dislocation of the long head of the biceps muscle are believed by Canton and other good authorities to be in reality lesions of rheumatoid arthritis. I have myself been in the habit of regarding them, in cases where there is no other evidence of rheumatoid arthritis, as being due rather to what Duplay calls periarthritis, where the disease is outside of the joint, the articulation itself not being involved. I would suggest that, in the absence of other evidence of rheumatoid arthritis, this may be the case here. While rheumatoid arthritis is common in the hip-joint and in the fingers, periarthritis is more common in the shoulder, and I believe that it is the cause of these changes in the relations of the biceps tendon in many instances.

Dr. Davis: I would ask Dr. Ashhurst if the condition of periarthritis, to which he refers, is a different affection from rheumatoid arthritis?

Dr. Ashhurst: Yes, it is to this extent, that it does not affect the joint itself, the crackling and grating sounds that are heard on moving the part having their seat in the neighboring bursæ and tendinous sheaths, and not in the articulation. The term periarthritis has been used by Duplay and other French surgeons to designate an inflammatory affection occurring in the tissues around a joint, particularly that of the shoulder, where it is accompanied by wasting of the deltoid, and often follows blows or other injuries of the part. The inflammation may, no doubt, be in some cases of

a rheumatic character. The essential point is that the lesion is periarticular and that it does not involve the joint itself.

Dr. F. P. Henry: I would call attention to the fact that, in the male, rheumatoid arthritis is more apt to be mono-articular and to attack the large joints, than in the female. Dr. Davis's explanation of the pathology of these cases is, in my opinion, correct, and is supported by an observation of the late Dr. Fagge. This well-known authority describes the disappearance of the long head of the biceps, in cases of rheumatoid arthritis of the shoulder-joint, as a frequent occurrence.

Dr. Ashhurst: There are a great many questions of extreme pathological interest brought up by Dr. Davis's cases, and it is a fact that as yet we know but little certainly with regard to the essential nature of these affections. With regard to the nodule on the patella, many here will remember a case shown to us by the late Dr. James H. Hutchinson, in which nearly all the bones of the body exhibited similar bony outgrowths. Whether that was a case simply of multiple exostoses or one of myositis ossificans, I have never felt certain. Then, as to the cases of arthritis deformans or rheumatoid arthritis, there is very little difference clinically between the articular changes seen in these and the changes which occur in the spinal arthropathies described by Charcot. I do not myself believe that they are the same; but it is maintained by excellent authorities that they are. It will be remembered that many years ago the late Dr. John K. Mitchell wrote a very suggestive essay on the "Spinal Origin of Rheumatism," and though the gross changes in rheumatoid arthritis are familiar to us, there are a great many questions as to its essential pathology and as to the mutual relations of joint affections and central nerve-lesions in regard to which we are still ignorant.

Dr. Davis: I would simply like to state my belief that there is no essential difference pathologically between the two processes; whether periarticular or intra-articular, that is to say: you may have one structure affected in one individual, and the other in another individual. As regards both of these cases, I have no doubt that they are cases of rupture of the long tendon of the biceps muscle; nor have I any doubt that the lesion occurred in the joint and that the pathological process was in the joint and not peri-articular, and that the creaking was not due to structures outside of the joint alone; but involved also those inside of the joint. As regards the older of the two men, who has had the disease for a longer time, the joint-changes are more marked and have progressed farther. The other is only aged thirty-seven years, and one would not expect to have such marked evidence of rheumatoid arthritis as in the former case. When he has had it longer, the affection will, in all probability, show the same changes as the other case does.

In such cases the disease does not reach its culmination all at once, and then remain quiescent; but it has remissions, and marked joint-changes may occur yet in these cases. In the older man, where the disease has been

longer in existence, there is evidence of disease in other joints of the body. Not only does the knee-joint show corroborative evidence, but the finger-joints are enlarged and the palm of the hand has in it one or two hard fibrous nodules. These are evidences of the general constitutional condition. I hardly believe that there is any marked difference, except in degree, between the lesions of rheumatoid arthritis of adults and old people and those attending this disease in youth. That there is a great difference in the etiology of the affection in these two conditions of life, I hardly think possible, because I have seen as marked evidence of rheumatoid arthritis, or arthritis deformans, in a young girl aged eighteen years as I have in older persons.

THE DEVELOPMENT OF BLOODVESSELS IN NEW TISSUES RESULTING FROM DISEASED GROWTH, AND IN TISSUES NATURALLY AVASCULAR.

By ARTHUR V. MEIGS, M.D.

[Verbal Communication, June 5, 1895.]

The subject of which I desire to speak is the development of bloodvessels in new tissues and in tissues which are naturally avascular. It is not my intention to give an exhaustive disquisition upon the subject, but only to record a few facts in relation thereto that are important and interesting The best known exemplification of the growth of bloodvessels in a tissue naturally avascular is found in the cornea of the eye when it becomes inflamed. Another illustration is furnished by the valve-flaps of the heart, which in their natural condition are without bloodvessels, but which have them developed as a result of disease. It is well known that the capacity of the tissues of the human organism for development does not cease at the time of birth, or even when adult life has been reached. As a result of disease, tumors grow, and they often reach great size; but besides the growth of tumors, other forms of growth are constantly taking place which furnish equally positive, though less gross, evidence of this persistence of the capacity for development. As a consequence of endarteritis, a great amount of material is added to the organism in the form of tissue within arteries. In the obliteration of the pericardial sac by pericarditis, the result is not effected by simple adhesion of the parietal and visceral layers of the pericardium, but new tissue is formed between them, and this serves to bind the two

together. In a similar manner, when the great abdominal organs become adherent to one another or to surrounding tissues, as not uncommonly happens, there is more or less new material formed to hold the adhering surfaces together. This new material becomes organized tissue, which is almost always richly supplied with bloodvessels.

I will now ask attention to some drawings which illustrate the points I wish to discuss. The picture I have here shows bloodvessels in a diseased mitral valve-flap, and at the same time it shows the manner of growth of new tissue. Here is a vessel the calibre of which is so small as to be almost useless. I also wish to call attention to the character of the tissue observed within this bloodvessel. From the first section you would not think it a bloodvessel at all, were it not that there are other forming bloodvessels present in its vicinity, with similar appearances. Of this series of drawings the first is a section of heart and adherent pericardium. This has a deposit of new growth which is full of bloodvessels, which are in the newly-formed tissue. The second represents a specimen from a little girl, aged twelve years, in whom there was entire obliteration of the pericardial sac, the two layers being in contact and united. The new bloodvessels here are of various outlines and of various sizes. This shows a peculiarity to which I direct attention: there are vessels here which carry blood, and others nearly solid. In the nearly solid vessels there is only a slight opening present in each. Apparently at the same time that the vessels grew, some of them defeated their purpose by becoming closed.

I have exhibited pictures of the manner of formation of vessels in tissues naturally non-vascular. I will now show the development of vessels in newly-formed tissue. Here is a representation of new tissue from the pericardium of a girl ten years of age, which shows the developing bloodvessels. It shows two important peculiarities which are also shown in the four drawings below. In this one from the lung of a girl twelve years of age it is very easy to distinguish the muscular coat, the plicated membrane, and also the spindle-shaped cells

of which the new tissue is made. A large proportion of the young tissue is made up of this kind of cells. I observe here vessels in the new-formed tissue within the artery. I made a series of sections from this same tissue, and found the condition of things shown in this picture, a good-sized vessel passing in from the perivascular tissue through the muscular coat to nourish the new-grown tissue. To those familiar with pathology, it is known that in the normal condition there are no nutrient bloodvessels which penetrate through the muscular coat of arteries; but here are a number of new vessels entering to nourish the new tissue inside of the muscular coat. Here the vessel is broken up to be distributed to the newly-formed intima.

There is another peculiarity which is well shown. Blood-spaces appear to develop in the new tissue which are like the blood-islands in the area vasculosa of the chick and in mammalian embryos. These spaces in the diseased tissue contain embryonal corpuscles. Bloodvessels, therefore, develop in the pathological tissues as blood-islands containing blood-cells, exactly as they are so well known to do in embryos, and only later can the connection with the general blood-stream be established.

REMARKS ON HYDROPHOBIA.

By CHARLES W. DULLES, M.D.

[Read June 5, 1895.]

About a year and a half ago I read before the College a summary of the cases of so-called hydrophobia that I had collected, as occurring in the United States during a period of five years. Since that time I have continued (as for a number of years) the collection of these cases and the study of them, and I have recently prepared a report for the Medical Society of the State of Pennsylvania on this subject, the facts of which I would like to state to the College.

I have collected since my last report, and up to the present time, accounts of fifteen cases in the United States. Of these the oldest subject was eighty-three years of age, and the youngest three years. The deaths were attributed in thirteen cases to the bite of a dog, and in two cases to the bite of a cat. The period of incubation varied from three weeks to six months. I have the same conviction in studying these cases that I have expressed before, namely, that if the palpably spurious ones were eliminated, and if this were followed by the elimination of cases that careful study and familiarity with work already done and published would fully explain as due to the presence of some distinct disorder other than so-called hydrophobia, but few would be left to be discussed as deserving a specific designation. For example, one of the cases of the fifteen that have come to my notice was that of a driver of a beer-wagon in this city who died with the diagnosis of hydrophobia, but was found at the autopsy by the coroner's physi-

cians to have kidneys and lungs so diseased that the official record was put down as death from uræmia and pneumonia. I find that four of the fifteen deaths reported are from the bites of dogs not supposed to be rabid. In two of the cases death occurred in the Pasteur Institute of New York; in one of these cases the patient had been dismissed from the Bellevue Hospital as a case of hysteria. Three of the cases were plain lyssophobia.

I note again the useless practice of giving patients with supposed hydrophobia large doses of narcotics, especially morphine, and worse than useless attempts at nourishing by nutritious enemata. While practices such as these are recommended in standard text-books, it is hardly to be expected that common-sense views of this subject will be found generally diffused throughout the profession.

I thought it worth while recently to go over my notes for six years to see what was the outcome of what I call "mad-dog scares," and it has surprised me somewhat to find I have records of the biting of one hundred and seventy-five persons under these circumstances—that is, when dogs have been looked upon as rabid, and have bitten human beings or animals, or both. Of the one hundred and seventy-five persons thus bitten, I find only three deaths from so-called hydrophobia. This result, I have no doubt, represents a just proportion of the number of bites, by animals considered rabid, to the number of deaths; for there must be very many bites that never find record even in the daily papers, while probably very few deaths occur that do not come to publication in this or more accurately scientific ways. If this proportion is anywhere near correct, it is very unfortunate for Pasteur and his imitators in their extravagant claims of life-saving. The fact is that my notes indicate that a great majority of cases of so-called hydrophobia followed the bites of dogs which were probably perfectly healthy.

It is interesting to note that during the last year the Pasteur Institute in Paris claims to have cured nearly twelve hundred persons. This word "cured" signifies, in the language of the

Pasteur Institute, rescued from, or at least protected from, the development of hydrophobia. These figures are like all the recent figures from this Institute, which would indicate that since Pasteur's time the liability to hydrophobia in France has enormously increased, and that but for him and his "little inoculations" (to use his own expression), there would be dying in France now every year of hydrophobia a preposterously large number of victims—say about fifteen hundred. I wish the ridiculousness of this claim were plainer to the writers of books than it appears to be.

So far as the prevention of hydrophobia is concerned, there is a simple method of treating suspected dog bites that I have practised in many cases during the past thirteen years, and so far the mortality of my patients is nothing—a figure better than that of Pasteur and his imitators. I would recommend the total abandonment of the practice of cauterizing with nitrate of silver, which, I believe, is entirely senseless on theoretical grounds, and judging from what I have seen and studied, of no value at all in actual experience. A large number of the cases of hydrophobia that I have investigated occurred in persons who had been subjected to early and thorough cauterization with nitrate of silver. In fact, I think that in some cases the injury done by the caustic was worse than that done by the dog.

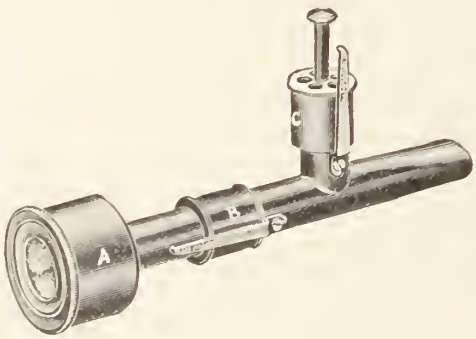
The proper way to treat dog-bites is to cleanse them with surgical thoroughness and to dress them for a few days with a moist antiseptic dressing, carefully avoiding everything which could irritate them.

PRESENTATION OF A NEW INSTRUMENT FOR PNEUMOTHERAPY, WITH EXHIBITION OF A PATIENT.

Dr. Solomon Solis-Cohen: I desire to show to the Fellows of the College a little instrument for the facilitation of pneumatic treatment of diseases of the lungs. While it is a development of my own work on the subject for a number of years, it takes its remote origin in the tube, four or five feet long and narrowed at the far end, used by Ramadge in the early part of the century in the treatment of consumption. In the history of medicine it has often occurred that men without exact scientific training, but of close observation and practical talents, make really valuable discoveries; but their methods fall into disrepute on account of the crude way in which they are presented to the profession and the personal characteristics of the introducers. Ramadge's excellent work on the treatment of pulmonary diseases has met with this fate; but there is no question that the method of treatment he devised is a good one, and one capable of scientific application. The idea is simply to offer resistance to the act of respiration, and thus make the patient use greater muscular effort. The effect is twofold: first, to strengthen the muscles of respiration by exercise; second, to secure greater expansion and more complete compression of the air-cells in inspiration and expiration respectively. Further, by prolonging the act of inspiration and diminishing the intra-thoracic pressure, the blood is invited into the chest from the periphery, and by offering obstruction to expiration and increasing intra-thoracic pressure the blood is driven out of the chest toward the periphery. In this way there is produced alternation of effect; the blood being now driven into the chest and filling the chambers of the heart and the pulmonary capillaries, thus insuring greater depuration by the air, and then in turn better and more widely distributed through the general circulation. It is also seen that the mere muscular effort favors the nutrition of the respiratory apparatus as a means of gymnastics.

The objection to the tube of Ramadge is that it is without any means of regulation of the pressure, and to obviate this I introduced, some seven or eight years ago, a pair of valves, one opposing inspiration, the other opposing expiration, by a known and controllable pressure, terming them, for this reason, "pneumatic resistance valves." The first instrument, which I

presented to the College a few years since, was accurately adjusted to measure the amount of the resistance, and it was successfully employed in a number of cases. The demand for the instrument, however, was so limited, and the care required in the construction so great, that the manufacturers were obliged to put up the price to a point which almost prohibits its use. This led me to make an alteration in the way of simplifying the instrument and reducing the expense. The new instrument, which I now present has a simplified mechanism, which does not admit of so



accurate adjustment as formerly, but which gives approximately the amount of pressure employed. The regulation is effected, as before, by a spring, the tension of which is increased or diminished as desired. A scale at the side of each valve is numbered 3, 4, 5, 6, meaning that when the milled head of the screw-cap covering the valve is opposite one of the divisions thus indicated the pressure is approximately $\frac{1}{30}$, $\frac{1}{40}$, $\frac{1}{50}$, or $\frac{1}{60}$ of an atmosphere, as the case may be. At the front, and communicating with the valve that opposes inspiration, is a receptacle the floor of which is a disk of wire gauze, on which a piece of absorbent cotton may be laid to carry any desired medicament. I do not think so much as some others may do of the medicament feature, but some patients will use an instrument of this kind only when medication is in some way or other connected with it. The chief use is as a means of regulated pulmonary gymnastics. It may thus be employed in the treatment of asthma and emphysema, or for the purpose of increasing thoracic expansion in the prophylaxis of pulmonary tuberculosis in predisposed subjects, or in the treatment of pulmonary tuberculosis in the early stages. While it will not replace inhalation of compressed air in the treatment of pulmonary tuberculosis in any great degree of development, it may be used to keep up the good effect after recovery is well advanced. It is made by Messrs. Codman & Shurtleff, of Boston, who inform me that they can sell it at retail for two dollars—certainly a moderate price.

In illustration of the good effect of pneumatic treatment, a patient, who

is himself a member of the medical profession, has kindly come here to show the increase in respiratory capacity, as well as his general improvement, gained under the use of compressed-air. About two years ago he came to me with extensive pulmonary consolidation, one or two small areas in which râles of softening were heard, and a chest expansion of 2½ inches. There was fever, the temperature at times reaching 101.5° F., and the sputum was filled with bacilli. Under treatment with compressed air, with proper diet, the use of cold water, and such medication as was deemed necessary from time to time, fever disappeared, flesh was regained, cough diminished, and bacilli have been absent from the sputum for more than a year. While signs of pulmonary consolidation remain, all indications of active disease have, to my ear, entirely disappeared. The chest expansion is now over three and a half inches. His gain in weight has been about twenty pounds. There have been more than a dozen examinations of the sputum during the year by Drs. Coplin and Bevan, Dr. McFarland, and Dr. Kneass, and there were no tubercle bacilli found.

This is not presented as an isolated case, for as such it would mean nothing, but as an illustration of what may commonly be expected in the case of an intelligent patient, able and willing to co-operate with his physician, when pneumatic measures are added to the dietetic, hygienic, and medicinal regimen indicated by the conditions present in the individual case.

DISCUSSION.

Dr. Charles W. Dulles: Has the patient any cough or expectoration now?

Dr. Cohen: He reports that he still has some expectoration in the morning, but no cough at other times. The sputum is free from bacilli.

A CASE OF SECONDARY CARCINOMA OF THE BONES.

Multiple Fracture; Associated Duodenal Ulcer; Polyuria.

By J. H. MUSSER, M.D.,
ASSISTANT PROFESSOR OF CLINICAL MEDICINE, UNIVERSITY OF PENNSYLVANIA; PRESIDENT OF THE PATHOLOGICAL SOCIETY OF PHILADELPHIA.

[Read June 5, 1895.]

A. B. C., male, aged thirty-four years, civil engineer; born in Maryland, of gouty parents.

There was no specific history, and no hereditary specific taint. The habits of the patient had always been good; he was a hard, energetic worker, exposed, as division engineer on the railroad, to all kinds of weather; sometimes working twelve and eighteen hours in twenty-four, frequently with clothing wet all the time, and often without food.

The patient was generally in good health, with the exception of dyspepsia. The dyspepsia was of the acid variety, on account of which he took enormous doses of bicarbonate of soda; he carried the drug in his pocket, and literally took handfuls at a time for relief.

Four years ago he began to suffer from what was alleged to be rheumatism. A short time previous to this he had two of the right upper molars extracted, and from their site a hard mass developed. Later, nodes developed in different parts of the body, under the periosteum.

He visited Carlshad in 1889, and was told he had periosteal rheumatism. He removed to Philadelphia in the fall of 1889; he was treated for rheumatism, and put on a very low diet.

I saw the patient January 7, 1890. He was extremely anæmic, and there was some emaciation and great prostration. The red blood-corpuscles numbered 2,500,000. He suffered extremely from acid and flatulent dyspepsia; the bowels were regular. He had grave polyuria. There was a loud systolic murmur at the aortic orifice, transmitted into the vessels of the neck. There was extreme pulsation of the aorta at the root of the neck

and in the abdomen. The pulse was frequent, quick and bounding. Lungs normal; liver normal size. No cerebral or spinal symptoms.

The node in the right upper jaw resembled an epulis. It had not recently increased in size and caused him no inconvenience. It was as large, in circumference, as a quarter of a dollar, half an inch thick, hard, very red in appearance. It would swell irregularly, and bleed very much, after which it would be reduced. Sometimes the bleeding occurred on slight provocations; strong sucking action of the mouth caused it.

The following is the order of development of the nodes:

1. On right upper maxilla (in the mouth).
2. On the head of the right tibia.
3. On metacarpal bone of right hand.
4. On right ulna, at its upper portion.
5. On the right femur, at its middle portion.
6. On left tibia.
7. On the sixth rib, right side.

The nodes on the extremities were occasionally the seat of considerable pain and tenderness, and, according to the report of the patient, varied in size from time to time.

The anæmia improved, as shown by various blood countings, which have been mislaid; polyuria continued.

February 17th. Urine 3520 c.c.; sp. gr., 1007. Urea .41, or 14.432 gm. per day. Phosphates 0.07, or 2.464 gm. per day. Uric acid, albumin, and sugar none. Reaction acid.

The strength improved somewhat, and early in the summer he went to Atlantic City. The patient had been bedfast all winter, however, and during this time, and while at Atlantic City, experienced several fractures.

The patient was again seen by me at his home in Philadelphia, September 19, 1890. His polyuria had improved somewhat. Thirst, however was extreme as yet. The cardiac dulness was much increased, apex in fifth interspace, mitral murmur marked, increased dulness in the course of the aorta. Liver dulness was increased upward one inch. There was epigastric pain and tenderness, apparently not increased by food, but paroxysmal.

Analysis of Urine, September 23, 1890. Amount, 6 pints, slightly acid, straw-color; sp. gr. 1005, no albumin or sugar, pus in very slight quantity, phosphates in very great abundance.

The volume of urine passed each day, from February to October, 1890, was constantly above the normal. The lowest quantity noted was on September 25th, the amount being two quarts and four ounces. Generally, it was between four and five quarts, occasionally, however, rising to six, and even seven quarts in twenty-four hours.

On the 25th, the patient had a profuse hemorrhage from the stomach; the blood was bright in color, not mixed with food, and the gastric hemorrhage was followed, in four hours, by a large discharge of black blood from the

bowels. Another hemorrhage occurred on the succeeding day, causing the intense anæmia and profound exhaustion that his condition would predispose to. Red blood-corpuscles reduced to 900,000. The usual symptoms of anæmia developed; fever and delirium were particularly noticed. October 3d, another hemorrhage took place, followed by death in six hours.

The hemorhages of the 26th and of October 3d were predicted by the patient, on account of his sensations. He experienced a sensation of trickling of blood, a little to the right of the median line in the epigastrium. This continued about an hour, attended by increasing weight and fulness in the left upper quadrant, and followed by the hæmatemesis.

After the first hemorrhages there was œdema of the face and extremities, and a hypodermic injection was followed by local tenderness and a subcutaneous hemorrhage about the point of puncture. During this time, without an anodyne, the patient suffered much from local pain.

Autopsy. Permission was given to examine the stomach alone, and remove a portion of the mass from the rib and clavicle.

The stomach was dilated; it contained blood. The duodenum was the seat of an ulcer, one-half inch in diameter, with hard, rounded edges, and which had perforated the walls. Adhesions surrounded the ulcer, and the floor was made up of pancreatic structure. The hemorrhage was from a branch of the pancreatic artery, which could be seen in the ulcer.

The portion from the clavicle was examined by Prof. Allen J. Smith, now of Galveston, Texas. He reported that the structure was that of a carcinoma, the primary source of which was found in the epithelial structures about the teeth. In the accompanying sketch the structure is described by Prof. Smith.

Examined fresh teased portion from rib in a solution of sulphate of sodium of a specific gravity of 1026, with a bit of methyl blue added for fixing the cells. I find among the cells the accompanying forms: I believe all those marked "*a*" to be epithelial, and the condition, hence, cancer. The others are, to me, embryonal blood capsules; "*b*" being probably a nucleated white cell, and "*c*" nucleated reds, the nucleus gradually fading out as indicated by letters (c_1, c_2, etc.). I have attempted to keep the relative sizes from Zeiss D. D. oc. 4. In the case of the clavicle there are undoubted evidences of cancer, of a flat-celled type, and the tumor showing in it is made up largely of such cells. [Letters refer to a pencil sketch, which could not be reproduced, sent with the report.]

There are several features of interest in this case, and first of all, the associated pathological conditions, *multiple carcinoma* of the bones, *duodenal ulcer* and *polyuria*. The association of the former is purely accidental, no doubt, and without significance; the latter may have been dependent upon one or the other of the former conditions.

The Polyuria. (*a*) I cannot, in an extended research, find any mention of the association of polyuria with carcinoma of the special variety we have to deal with. Naturally we were led to believe a secondary growth must be present in the pancreas, or perhaps in the region of the fourth ventricle of the brain. In both of these situations a growth has given rise to diabetes insipidus. The symptoms do not allow one to think a cerebral growth was present, and the post-mortem failed to reveal the presence of a growth in the pancreas. Gregoire, in his paper on "L'Urine dans le Cancer" (F. 1248, 1883–84, No. 15), does not refer to olyuria in cancer.

In all probability, the excessive discharge occurred because of the tissues at fault, rather than because of the lesion.

Since the case has been under observation I have studied many cases of rachitis, in which an excessive flow of urine was observed. One infant was almost continuously urinating, and the soaked diapers yielded a fluid, the specific gravity of which ranged, at different times, from 1000½ to 1003

The Duodenal Ulcer. (*b*) This was not suspected during life, as there were no symptoms pointing to its presence. Dyspepsia plagued the poor fellow many years, and the acidity from which he suffered was spoken of in the notes. He never suffered gastric pain until nine days before death. The ulcer was an old one, and, undoubtedly, without the usual symptoms until the last ten days of illness.

The excessive acidity alone might have been taken as indicative of an ulcer, either gastric or duodenal. It was not practicable to employ the usual tests of the gastric contents.

When discovered at the autopsy it was thought there was carcinoma about the edge of the ulcer, but further investigation failed to disclose its presence.

Multiple Fractures. (*c*) I have asked Dr. Wharton, who attended to the surgical requirements of the case, to describe the various complications.

"I saw Mr. —— in March, 1890, and found him suffering from a fracture of the left femur in the middle third. The patient stated that the bone gave way while sitting in a chair, and the fracture was the result, as he

thought, of a sudden spasm of the muscles of the thigh. I found, upon questioning him that, a few months before, he had suffered from a fracture of the right clavicle, which had resulted from a sudden turning in bed. On examination I found a large mass of elastic callus about the seat of fracture in the clavicle, the union being firm enough to allow of free use of the arm of the injured side.

"The fracture of the femur was treated by mean extension, and lateral support was given by bran-bags and splints, and, by the end of four weeks, union had so far taken place that the limb could be lifted in the dressing without causing any displacement of the fragments and without causing him any pain.

"At this time, while moving himself in bed to change his position, the right femur suddenly gave way in its middle third at a point corresponding with the thickening of the bone previously mentioned. This fracture was treated as the previous fracture of the femur, and after a few weeks seemed to have made some progress toward union. The patient, a short time after the fracture of the right femur, one evening while raising his body by means of his arms, suddenly felt his right arm give way, and, on examining him a few hours afterward I found an oblique fracture of the right humerus about its middle third. This was treated upon an internal angular splint, with external splint of binders' board, and in several weeks there was some union at the seat of fracture.

"The patient was at this time sent out of the city for the summer, and I saw him once during his absence from the city, and examination showed that there was some improvement in the condition of all the fractures.

"Upon the return of the patient to the city, in September, I examined him, and found that the fracture of the humerus was quite firm, although the union was not bony, but was of sufficient firmness to permit him to use the arm moderately; the fractures of the femur were not so firmly united, and that of the left femur showed a large amount of swelling in the region of the fracture, and there was more motion in the seat of the fractures of the femur than at the time of my previous visit.

"Upon post-mortem examination the fracture of the clavicle, on section, showed that there was no true bony union, and that the fragments were surrounded and held together by a mass of fibrous and spongy tissue; a like condition existed at the seat of the fractures of the humerus and at both fractures of the femur.

"All the bones were in a softened condition, and could be readily cut with a knife or scissors.

"The case proved to be one of secondary cancer of the bones, and the softening and fragility were very marked, as evidenced by the ease with which they fractured upon slight provocation.

"As regards the prospect of firm union of fractures in cases of this nature, my experience has been that there is no true bony union, and that the union which does occur is simply that which results from the development of a

new growth at the seat of fracture. I have had under my care, within a few years, two other cases of secondary cancer of the bones, in both of which the disease resulted from cancer of the breast. In one of these the clavicle was fractured in turning in bed, and in the other case the femur was broken in the middle of its shaft by a similar movement, and in neither case was there any union at the seat of fracture up to the time of the death of the patient."

It is well known that carcinoma of the bones is rare as compared with sarcoma. Markoe (*Diseases of Bone*, 1872) treats most extensively of it. Geissler's paper (*Arch. of klin. Chir.*, 1893, vol. xlv., p. 704) is most interesting, based on the modern views of carcinoma. It is not well to go back into the literature of the disease. Isolated cases are reported as carcinoma, when, on the face of them, they are undoubtedly sarcoma.

The disease is always secondary. The primary growth appears most frequently to be in the breast. All authorities point to the necessity of exercising great care to find the primary growth. The prostate, the testicles, the thyroid, the œsophagus, the pharynx, the penis, may be the seat of small growths. Billroth disclaims the reported cases that appeared to originate in the lower jaw, the anterior surfaces of the tibia, or the lymphatic glands of the neck, for the close proximity of skin or mucous membranes would invite invasion from either of these primarily affected structures. In one of Bryant's cases, a scar in the heel became carcinomatous, and from thence extended to the os calcis.

The primary growth may be present without symptoms. Frequently the primary growth atrophies. There is almost always a curious disproportion between the primary seat and the metastasis. The former is small; the latter very extended. Thus, in one of the cases under Delafield's care (quoted by Markoe) the primary scirrhus of the breast was very small, very hard, and fibrous, while nearly all the bones were affected. In Perl's case of cancer of the vertebra, the primary growth was found to be in the interior surface of the stomach—a hard, cicatricial cancer.

Von Recklinghausen (1891) points out that the prostate may be the unsuspected primary seat in many cases. The naked eye

appearances of this gland, when removed, often fail to disclose its character.

Von Bergen insists on extending the search; one of his cases was remarkable. The case was of thirty years' standing. A tumor of the liver was presented. It was thought to be an echinococcus, and was to be operated on. On examinations of the testicles, two small, adherent, knotty swellings were found, which the patient said, had been there for a long time. The post-mortem later verified the diagnosis.

Geissler, to whose article I am indebted for much of the above, reports a case from the Berlin clinic which originated in the bladder. The scapula became involved secondarily, three months after bladder symptoms arose. The nature of the disease in the bladder was very obscure, and not until operative measures were resorted to did they discover the character of the lesion.

Diagnosis. It can readily be seen that in certain diseases, as cancer of the vertebra, the diagnosis of which is often difficult, the detection of the primary growth is of pronounced aid in the recognition of the disease in question.

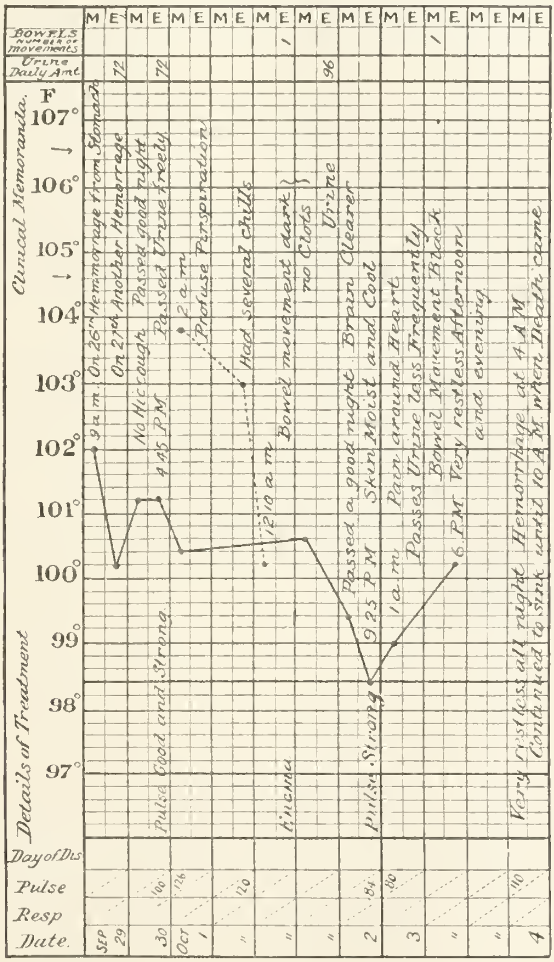
It can also be seen that, conversely, if carcinoma is found in a portion of an excised tumor connected with bone, and removed for diagnosis, obscure symptoms connected with internal organs may be explained.

In the case we have under discussion, had a portion of the primary growth been removed for examination, the diagnosis of syphilis or rheumatism would not have been made, and the man spared the expense and fatigue of foreign travel. There was no ground upon which such diagnosis could have been built.

In a review of the cases of carcinoma *versus* sarcoma, we find that the latter usually occur earlier in life, although the former may be seen as early in rare cases. The duration of carcinoma is greater than that of sarcoma. The metastatic growths are more abundant in the former than in the latter.

The temperature during the course of the disease was slightly above normal, varying from 99° to 100°. After the hemorrhage from the stomach the temperature rose; it was no doubt

due to the anæmia. The record is of interest, and is, therefore, appended, and with it the notes of the symptoms during the period of hemorrhage.



September 26th. Hemorrhage from stomach, 2 quarts 2 ounces; pulse feeble and rapid, 120, one hour after hemorrhage falling to 90, firm and full.

27*th*. Hemorrhage from bowels and stomach; had slight chill before hemorrhage; pulse weak, ran up to 162; skin soft. Gave hypodermatic of digitalis and whiskey. Urine, 1 quart and 14 ounces.

28*th*. Sleeping sounder; pulse better; urine, 2 quarts and 8 ounces.

29*th*. Mind wandering; sleeps a good deal; pulse weak; had several weak spells; no pains, no hiccough.

30*th*. Had very good night; no hiccough; passed urine freely, 3 quarts 10 ounces; no movement of bowels; pulse 100, fairly strong. Gave tablespoonful of raw beef.

October 1*st*. At 12.10 A.M. Pulse 86; in a profuse perspiration. At 2 A.M. Pulse 126; had several weak spells; urine 3 quarts. Gave enema. Bowel movement dark, no clots.

2*d*. Slept all night; urine not so free; pulse strong; had pain around heart. 9.25 P.M. Pulse 84; brain clearer; skin moist and cool.

3*d*. Pulse 80, at 1 A.M. Passed a fairly good night. 6 P.M. Bowel movement, black; very restless all the afternoon and evening.

4*th*. 2 A.M. very restless all night; pulse 110; hemorrhage at 4 A.M. Continued to sink until 10 A.M., when death came.

SUMMARY. Male, thirty-four years, primary *carcinoma* of maxilla; secondary carcinoma of bones; multiple fractures; diagnosis during life, syphilis and rheumatism; exact diagnosis of carcinoma could have been made from section.

Death from hemorrhage, due to *duodenal ulcer*. Ulcer not suspected during life until the occurrence of hemorrhage.

Diabetis insipidus.

Duration, four years.

DISCUSSION.

DR. THOMAS S. K. MORTON: I have had very little experience in this disease, and it is limited to a single case, which occurred several years ago. It was in a woman in whom a carcinoma of the breast, after being removed once, had recurred. One day while walking across the room, her foot tripped on the carpet, and she fell and fractured her hip, which she attributed to the fall. But on account of the previous history, I concluded that the bone was the site of cancerous deposit, and I gave an unfavorable prognosis. She died in a few days of shock. I made a post-mortem examination, and found only a mere shell of bone remaining, the femur being changed into a mass

of encephaloid disease. The disease had slowly progressed until the bone was so far invaded that it gave way under the weight of the body. This being the only case that I have met with, makes me think that the condition must be rare. I have seen many cases of cancer, but this was the only case of secondary cancer of the bone that I can recall.

THE PRESIDENT: The latency of the duodenal ulcer in the case reported, well worthy of mark. A number of these cases have been reported, and this is one more, where no symptoms of this affection existed during life by which it might be suspected.

A CASE OF DERMOID TUMOR OF BOTH OVARIES COMPLICATED BY A DEPOSIT OF BONE UPON EACH SIDE OF THE TRUE PELVIS, HAVING NO CONNECTION WITH THE TUMORS.

By CHARLES P. NOBLE, M.D.,

AND

JOSEPH P. TUNIS, M.D.

[Read October 3, 1895.]

Although the presence of calcareous matter in and around the ovary has been frequently demonstrated by abdominal surgeons of large experience, a careful examination of the masses removed has almost invariably proved that they were examples of simple calcification, and not of true ossification as had been supposed. Macroscopically, it is impossible to make a positive diagnosis. These calcareous masses resemble very closely irregular lumps of bone. They may be irregularly nodular in outline, of such a firm structure as to require the use of a saw before they can be divided, and yet on cross-section they present no regularity of structure, but are, as a rule, made up of a homogeneous deposit of lime salts, more or less firmly held together by a fibrous stroma. In the great majority of cases, when these masses have been examined under the microscope, no evidence of true bone has been found. When, therefore, unmistakable evidence of commencing ossification was demonstrated under the microscope in the specimen removed from the patient about to be described, the case

was deemed of sufficient interest to report in detail. Some features of this case are unique. The history is as follows:

Mrs. T., aged twenty-four years, has always been sterile. Her menstruation began at the age of fourteen. It was never regular, and lasted from one-half to two days. She has always had severe pain before and after the menstrual periods. Her general health has been fairly good, and when she came under observation she was well nourished. She complained especially of abdominal and pelvic pain of very marked character, which was becoming rapidly worse, so as to prevent her from performing her accustomed duties. She complained also of leucorrhœa; and of the presence of a tumor in the abdomen, which she first noticed eighteen months ago. Upon examination, the outlines of a cystic tumor could be readily felt filling the pelvis and extending as high as the umbilicus. From the history and the physical condition present a diagnosis of ovarian tumor was made, the inference being that it was of a dermoid character. An ovariotomy was performed after the usual methods, in the Kensington Hospital for Women, September 8, 1893.

After making the abdominal incision, the left index and middle fingers were introduced to explore the tumor and pelvis. The middle finger of the exploring hand immediately came in contact with something sharp enough and firm enough to divide the skin of that digit. It was then recognized, on

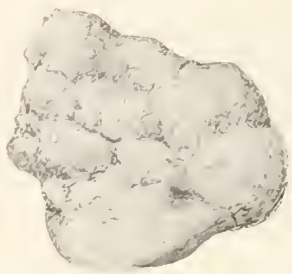
FIG. 1.

Irregular mass of calcareous matter and bone removed from the right psoas muscle. Sharp spiculum on lower margin.

further examination, that a considerable mass of bone was present near the evel of the brim of the pelvis and in the region of the right sacro-iliac joint. It was a spicule from this mass of bone that had inflicted the cut on the exploring finger. The mass had no direct connection with the tumor of the right ovary, which was peeled out of its bed of adhesions and removed. A small tumor of the left ovary was then removed. Subsequent examination

of these tumor masses showed them to be of a dermoid character. The larger one was about the size of a child's head at term, the smaller about as big as a good-sized walnut. The mass of bone from the right side of the pelvis was then enucleated from its connective-tissue bed, lying for the most part along the psoas muscle. It was irregular, nodular in outline, somewhat quadrilateral in shape, and presented one or two sharp spicula on its surface. (See Fig. 1.) It measured an inch and a half by an inch and three-eighths in its greatest extent, and was three-quarters of an inch in its greatest width. A smaller mass was felt in the left side of the pelvis, at a somewhat lower plane than that upon the right side, lying between the rectum and left pelvic wall. This specimen was also removed (see Fig. 2), and presented

FIG. 2.



Smaller nodular mass removed from the left side of the pelvis.

very much the appearance of the first specimen, although not quite as large.

The bed from which the specimens were removed presented a number of spicules of bone protruding through the tissues in the neighborhood of the region from which the specimens were enucleated. The mass removed from the right side had been in close relation with the psoas muscle, that on the left side was situated much more deeply and was in relation with the tissues of the great sacro-sciatic notch. It was not deemed advisable to attempt the removal of any additional spicules of bone, as they did not seem likely to inconvenience the patient in any way and were not sufficiently detached to be as readily removed as was the mass represented in the accompanying illustrations. As a subsequent microscopic examination led to the discovery of true bone in the masses removed, the case at once becomes one of peculiar interest.

After the pelvic cavity had been thoroughly irrigated and a drainage-tube introduced, the usual antiseptic dressing was applied, and Mrs. T. made an uninterrupted recovery. A short time after the operation she reported herself as feeling very well, and that she had never been better in her life. It is now two years since the operation. She has gained considerably in weight and is free from pelvic pain.

Microscopical examination of the masses removed from the brim of the pelvis. After decalcifying a portion of one of the specimens in a solution of nitric and chromic acids[1] for two weeks, the specimen was mounted in paraffin after the usual method and sections made with great difficulty. Under

FIG. 3.

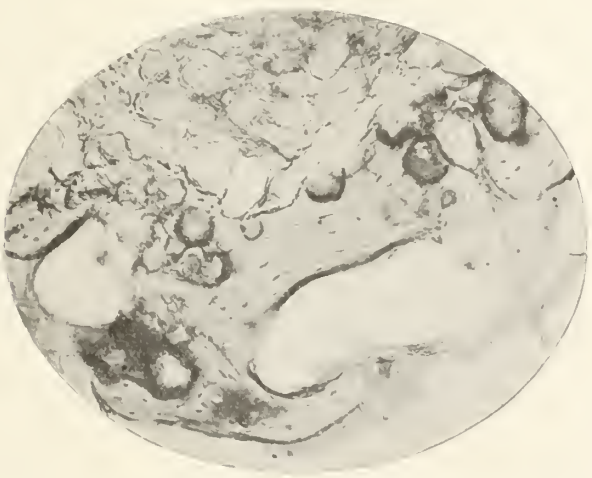


Photo-micrograph of a decalcified section of one of the masses, showing a portion of true bone characterized by numerous lacunæ. Magnified 30 diameters.

the microscope the greater part of the section was seen to consist of a fibrous stroma still containing a few calcareous salts, the greater quantity of which had been removed by prolonged soaking in the acid solution, leaving frequent air-spaces through the section. At a number of points, however, true ossification was demonstrable, as can be seen in the accompanying illustration taken from a low-power (30 diameters) photo-micrograph of the specimens. At these points the irregular fibrous stroma is lost, and there is a firmer, clearer matrix containing numerous lacunæ.

Aside from the pathological questions involved in the nature of the specimens removed, the most interesting question in connection with the case is in regard to the origin of these bony formations, as well as the probable increase in size of the spicula of bone which are now present in the pelvic tissues of

[1] Decalcifying solution (Rutherford):

Chromic acid	1 grm.
Water	200 c.c.

Then add 2 c.c. nitric acid.

this patient. It seemed probable at first, when dealing with the right side, that this mass of bone had originally developed in the dermoid tumor, had ulcerated its way through the sac of the tumor, and in that way become independent of and separate from the original growth, but when in examining the left side the second specimen (Fig. 2) was found so widely removed from the tumor, it became a matter of extreme improbability that both of these masses could have ulcerated their way through the dermoid tissues and become attached separately to either side of the pelvis. It would certainly be an unheard-of event for a piece of bone to exist in two dermoid tumors in the same woman, and for each of them to set up an ulcerative process and escape from the tumor, the masses of bone becoming attached in a new position, without the development of general peritonitis or some form of pelvic suppuration. It must, therefore, be concluded that this bone-formation took place independently of the growth of the tumors.

As there are still existing numerous spicules of bone in this woman's pelvis to act as a nidus for further development, the subsequent course of this case will be a matter of interest, especially in regard to her pelvic soft parts. It is not likely, that the entire pelvic region will become ossified, although such an occurrence is possible. If it should result, which seems extremely unlikely, the case would then assume some of the features of progressive muscular ossification. This pathological condition (myositis ossificans multiplex or progressiva) is characterized by a stiffness, commencing in the extremities and becoming progressively worse, so that locomotion soon becomes impossible. It begins in one or more of the *joints* and rapidly extends. Little or no pain is experienced, and the lesions are readily demonstrated on inspection. This condition sometimes follows a slight trauma, but may occur without any such cause. It occurs in the muscles, intermuscular connective tissue, fasciæ, tendons, or periosteum. Eichhorst* describes a form of progressive bone-

* Hermann Eichhorst: Handbuch der speciellen Pathologie und Therapie, Band iii, s. 600.

formation which occurs most frequently in males from eight months to fifteen years of age. The first changes occur in the muscles of the neck and back, then in those of the shoulder and arm; subsequently the lower extremities are affected. Sometimes the jaw-muscles and certain muscles of the face are also affected. Such a condition is very readily differentiated from the case in point by the fact that the pathological process attacks the muscles progressively and the lesions are multiple in character.

In reviewing the literature of this subject there is little to be gleaned bearing on similar cases. The majority of the works on pathology consulted contained no reference to the subject beyond some general considerations of the formation of bone in connective tissue. Allied pathological conditions are, however, of interest as bearing indirectly on the subject.

In an excellent article on "Calcified Tumors of the Ovary," Dr. J. Whitridge Williams,[1] of Baltimore, writes: "Within the past year several gentlemen have sent us solid tumors of the ovaries which they supposed were of osseous nature, but on careful microscopical examination we found that they were not composed of bone, but were due to the calcification of ovarian structure, with which we are all familiar. True, osseous tumors may also occur in the ovary, but they are even more rare than calcified tumors, and it is far more difficult to give a satisfactory explanation for their occurrence than for the calcific changes in fibromata. And it must also be remembered that osseous formations occur but rarely in any portion of the body, while calcification occurs very frequently in many organs. Osseous formations of this character can only be explained by Cohnheim's tumor hypothesis." After a careful search through the literature of this subject, the writer says: "The only cases of osseous formations in the ovary are those mentioned by Fürst,[2] Reiss,[3] Waldeyer,[4] and Winckel."[5] And even these cases are open to dispute, as a microscopic examination was not made in every case. Solid tumors of the ovary are rare. Greig Smith says: "Of all tumors of the ovary, probably not more than 3 per cent. are solid." (*Abdomi-*

nal Surg., Amer. ed., p. 155.) Of 282 consecutive ovariotomies reported by Homans only three were for solid tumors of the ovary. Of 207 unselected ovariotomies collected from various operators by the *Pittsburg Medical Review* only seven were for growths of this variety. (Pittsburg, 1888.) Of 101 consecutive ovariotomies reported by Tait only two were for solid tumors. (*Diseases of the Ovaries*, American ed., 1853, p. 319.)

A philosophical explanation of the presence of these bony masses in the pelvis of this woman would be to regard them as an incomplete fœtal inclusion and to class the case among the "Endocyma" group of human monstrosities.[6] By this term is meant the more or less complete inclusion of a parasitic fœtus within the body of the autosite. In the large cavities of the body—the abdominal, thoracic, and cranial—the presence of a parasitic embryo is explained by true inclusion, the arching-over process of the walls in the autosite enveloping the parasite within them. In abdominal inclusion (fœtus in fœtu) the parasitic fœtus may be fairly well formed, but never reaches full development. On the other hand, it may be a mass no bigger than one's fist—of lowest development.[7]

In this connection it is interesting to recall the case reported by Dr. J. L. Atlee of congenital ventral gestation in a girl of six years, who lived seventeen years after the discharge of the mass from her abdomen. The full particulars of this case are detailed in the TRANSACTIONS OF THE COLLEGE OF PHYSICIANS, OF PHILADELPHIA, 1879, 3d ed., iv. pp. 231-248.

While the occurrence of these osseous tumors may thus be explained by a process originating in an early part of the embryonal life of the individual, their presence is more readily accounted for as a result of a pathological change in the psoas muscles. While one of the masses removed (as may be seen by reference to Fig. 1) resembled in outline an imperfect vertebra, it is difficult to imagine that another vertebral column included within the abdominal cavity of the patient should have undergone complete division and passed down into the pelvis in the substance of either psoas muscle. The spicules of bone presented equally on both sides of the pelvis.

Bibliography.

1. *Williams (J. W.):* Caleified Tumors of the Ovary. Trans. Amer. Gyneeolog. Soc., 1893, vol. xviii. pp. 359–376.
2. *Färst:* Knoehenneubildung in der Wand einer Ovarieneyste. Virchow's Areh., 1884, xevii. 131.
3. *Reiss:* Ueber Enehondroma Ovarii. Diss. Ing. Berlin, 1882.
4. *Waldeyer:* Diffuses Eierstoeksfibrom von eigenthümliehen Baue. Archiv. f. Gyn., 1871, i. 440.
5. *Winckel:* Frauenkrankheiten, 2. Auf. 1890, 640.
6. *Hirst* and *Picrsol;* Human Monstrosities, part iv. p. 199. Lea Bros. & Co., Phila., 1893
7. *Ahlfeld (F.):* Die Missbildungen des Mensehen. Leipsig, 1880. Text-book and atlas.
8. *Eichhorst.* See text.

DISCUSSION.

Dr. A. A. Eshner: The record just read raises the question whether or not the patient presented symptoms of rheumatoid arthritis. It is well known that in this affeetion osteophytes form in and around the joints, although their development in the neighborhood of the sacro-iliac articulation would be unusual.

Dr. Noble: There were no symptoms of rheumatoid arthritis. I have nothing further to say exeept that the patient's history was that she was always healthy, exeept that her menstruation had never been normal, and she remained well until the symptoms due to the presence of the tumors appeared.

A CONSIDERATION OF SOME OF THE NEWER PROBLEMS IN ABDOMINAL AND PELVIC SURGERY IN WOMEN.

By CHARLES P. NOBLE, M.D.,
SURGEON-IN-CHIEF IN THE KENSINGTON HOSPITAL FOR WOMEN.

[Read November 6, 1895.]

It is my purpose in this paper to discuss briefly some of the newer problems in abdominal and pelvic surgery in women, which at this time are attracting so much attention not only among gynecologists, but also in the profession at large. I shall report my work at the Kensington Hospital for Women during its past fiscal year, together with the results obtained, and consider whether these results would have been altered for better or for worse had I made use of other methods of treatment than those employed.

Forty patients have had non-operative treatment, or the rest cure. Of these one died.[1]

Cœliotomy has been performed 119 times for various conditions, with 6 deaths and 113 recoveries. A table of the cœliotomies follows :

Abdominal Hysterectomies.

Number of cases	37
For fibromata	16

Complications.

Malignant degeneration	1
Ovarian cyst	1
Ovarian cyst with unruptured tubal pregnancy fœtus	1
Par-ovarian cyst	1
Unilateral hydrosalpinx	3

[1] See seventh death.

Bilateral hydrosalpinx	2
Bilateral pyosalpinx	1
Calcareous and cystic degeneration	1
Bilateral salpingitis with dense adhesions	1
For ovarian tumor, retroflexion of the uterus, and adhesions (the other ovary previously removed for suppurating tumor)	1
For unilateral pyosalpinx, salpingitis, and retroflexion of the uterus	1
For bilateral pyosalpinx	4
For bilateral pyosalpinx and suppurating ovarian tumor	1
For bilateral hydrosalpinx	1
For bilateral ovarian tumors	1
For retroflexion of uterus, prolapsed, cystic, and enlarged ovaries	1
For cirrhotic ovary and incurable metrorrhagia (other ovary removed four years before)	1
For bilateral hæmatoma of ovaries, salpingitis and adhesions	1
For bilateral salpingitis and ovaritis, with retroflexion of the uterus and adhesions	8
For suppurating left intraligamentous ovarian cyst (one gallon) and right hydrosalpinx	1

OVARIOTOMIES.

Single	9
Double	2

Complications.

Resected ovary	1
Pyosalpinx	1
Malignant degeneration	2
Salpingitis and dense adhesions	1
Suppuration in cyst	1

In 11 other cases ovarian tumors were removed which are not classed under this head.

TUBAL PREGNANCIES.

Unruptured	3
Ruptured	5

Complications.

Gangrene of left tube and broad ligament	1
Hydrosalpinx	1

PYOSLAPINX.

Unilateral	4
Bilateral	8

Complications.

Suppurating ovarian tumors	2
Non-suppurating ovarian tumors	3
Suppurating ovaries	4
Intraperitoneal abscesses	3

In 8 other cases pus tubes were removed, which are not classified under this head.

HYDROSALPINX.

Single	1
Double	1

In 7 other cases hydrosalpinx was dealt with, not included under this head.

CHRONIC SALPINGITIS, OVARITIS, AND ADHESIONS.

Number of cases	11
Unilateral	6
Bilateral	5

HYSTERORRHAPHY.

Number of cases	28
Simple hysterorrhaphy, no adhesions	1
Combined with plastic operations, no adhesions	12
Combined with some other abdominal operations, or when adhesions existed	15

HERNIOTOMY.

For post-operative ventral hernia	3
Adventitious cyst, infected pedicles	3
Appendicitis (one abscess)	7
Abdominal myomectomy	3
Par-ovarian cysts	3
Chronic ovaritis: Both ovaries removed	2
One ovary removed	3
Acute salpingitis and peritonitis	1
Pelvic abscess	1
Cancer of the omentum	1
Cholecystotomy	1
Exploratory section	1

In addition, 238 other operations have been done as follows:

Miscellaneous operations	23
Shortening of the round ligaments	4
Vaginal hysterectomy	2
Vaginal myomectomy	1
Closing of a vesico-vaginal fistula	1
Ligation of the uterine arteries	4
Nephrorrhaphy (in two cases double)	5
Dilatation and curetting	71
Perineorrhaphy	62
Trachelorrhaphy	27
Amputation of the cervix uteri	24
Anterior colporrhaphy	14

Of this miscellaneous list of operations (excluding the abdominal sections) it is unnecessary to say much. The mere report of the cases themselves indicates the general character of the work done. All of these cases recovered, and in the plastic operations primary union was obtained in every case. In my opinion, the principles upon which the plastic surgery of women should be done have been so thoroughly worked out by Sims and Emmet (with some minor exceptions) that but little is left to their successors except to follow in their footsteps. Improvements in this field must be in minor details.

Deaths. There have been seven deaths in the hospital during the year, six of these following the operation of abdominal section.

The first death was in a case of suppurating hæmatocele due to a ruptured tubal pregnancy. The patient had general septicæmia, with a temperature of 104° at the time of operation, and had gangrene of the ruptured left tube and broad ligament. With irrigation and drainage of the pelvis the local conditions improved somewhat, but the patient died of general septicæmia on the seventh day after the operation. General peritonitis did not develop. This patient died because she was not operated upon sooner. Knowing the conditions in the case, blame does not attach to anyone except the patient herself, as operation was suggested earlier by her family attendant, but not accepted. Moreover, the progress of this case was very

insidious, and it did not appear before the operation that she was in such a desperate condition.

The second death was in a case of appendicitis with abscess and with pelvic peritonitis. This patient had been in bed many weeks, first, with an acute appendicitis, which apparently had subsided; and, second, with an attack of pelvic peritonitis, resulting in the binding down of the uterus and its appendages. It was not believed that there was an abscess in this case, as the mass which had existed earlier in its history had disappeared. Therefore, it was thought possible to cure both the disease of the appendix and the adherent uterus and appendages with one operation. The uterus and appendages were freed from adhesions and a hysterorrhaphy was done. Next the appendix region was investigated through the same incision, when it was found that a small abscess was present behind the cæcum. When this was discovered a second incision over the appendix region was made for gauze packing and drainage; but infection had occurred, and the patient died of acute septic peritonitis. It is possible that had the pelvic organs not been disturbed, and had the incision been made directly over the cæcum, that this patient might have recovered.

The third death was in a case of double pyosalpinx in a patient very much broken down from septic absorption, and who had had septic fever for weeks. She was decidedly septic at the time of operation. This operation was done rapidly, and the pelvis thoroughly irrigated and drained both with gauze and a glass tube, but she died of septicæmia on the fourth day. It was my intention in this case, knowing her prostrated condition and that septicæmia was present, to drain if possible by the vagina, and to leave the pelvic structures in, to be removed if necessary at some subsequent period. On opening the abdomen, however, the barriers between the pus and general peritoneal cavity were so frail that I thought it extremely doubtful whether the pus could be evacuated without breaking into the general peritoneal cavity. Moreover, the pus-tube on the left side contained several septa, and a portion of this pus-tube could not have been drained, as it was attached

high up in front of the broad ligament. This patient's life might have been saved had drainage only been employed, but this is a matter of great doubt. This patient died because she was operated upon "too late."

The fourth death was in a case of fibroid tumor in a woman sixty-seven years of age. She had had "womb trouble" for forty years, and had known of the existence of the tumor for at least fifteen years. The pelvic portion of the fibroid had undergone calcification, and another part had undergone cystic degeneration. The pressure of the tumor upon the bladder and ureters gave her such torment that she demanded operation in spite of a bad prognosis, which was given partly on account of her age and of her calcified arteries, but more especially because of very defective urinary secretion. The tumor was removed without difficulty, but she died of suppression of urine on the fourth day. No autopsy was permitted, but there was no reason to suspect the ligation of a ureter, as she passed urine freely for the first day.

The fifth death was in a patient having a retroflexed and adherent uterus and adherent appendages (recurrent peritonitis), upon whom a hysterectomy, with removal of the appendages, was performed. This operation was done May 31st, the first hot weather of this year, and the patient died of heat-stroke on the second day. Two other patients were operated upon on the same day, both of whom were affected by the heat in a minor degree, but recovered under the use of ice baths. In the patient who died it was impossible to keep the temperature below 103°, even by ice packs. This is the second patient in my experience who has died from heat-stroke after operation.

The sixth death was that of a woman having a suppurating ovarian tumor, who had had septic fever for five weeks before her operation, and who was greatly prostrated and distinctly septic at the time of operation. The tumor contained four quarts of pus. She died of septicæmia on the second day. It is unnecessary to point out that the tumor should have been removed so soon as attention was called to it by the septic symptoms.

The seventh death was in a patient suffering from ovarian

tumor, who was admitted to the hospital for operation when in the last stages of inanition from this disease. She died shortly after her admission and before an operation was performed. This woman had seen a number of physicians, who differed in their diagnosis and advice. She was recommended at last to consult a surgeon by a woman electrician. It brings up curious reflections upon the efficiency of medical advice that an ovarian tumor should have been permitted to grow until it caused the death of this patient—and that in 1895, in the city of Philadelphia!

Trachelorrhaphy versus Amputation of the Cervix. Trachelorrhaphy has been performed twenty-seven times, amputation of the cervix uteri twenty-four times, and anterior colporrhaphy fourteen times. The relation of these operations is of interest, as showing that amputation of the cervix has been chosen in preference to trachelorrhaphy about ten times. The other amputations of the cervix have been done for cases of procidentia. It is my practice, whenever the cervix is so thoroughly diseased that the morbid tissue cannot be removed satisfactorily by doing trachelorrhaphy, to perform an amputation of the cervix. In this way, I feel sure that better results can be obtained than by attempting to restore the contour of the cervix. I believe that this opinion is shared by the originator of the operation of trachelorrhaphy, Dr. Emmet.

The Conservative Principle in Abdominal Surgery. Of one hundred and nineteen cases reported, in sixty-four both the uterine appendages, with or without the uterus, were removed; in twenty-three, one uterine appendage was removed; and in thirty-two, none of the sexual organs were removed. The last group includes cases of hysterorrhaphy, the breaking up of adhesions, myomectomy, and abdominal operations proper as distinguished from the operations on the pelvis. In other words, in fifty-three of the one hundred and nineteen patients the functions of ovulation, menstruation, etc., were not interfered with by the operations. In several cases in which one ovary and tube were removed, and minor diseases, such as hæmatoma or small follicular tumors, existed

in the opposite ovary, the diseased part was exeised, the wound sutured, and the remaining part of the ovary dropped back. In all my work the principle has been recognized that the functions proper to women should not be interfered with except for good and sufficient reasons. The nature of this paper prevents a full account of the results obtained in carrying out this principle, more especially in cases in which a certain grade of salpingitis is present, especially when the appendages have been bound down by adhesions. Suffice it to say that the results obtained make it worth while, in my judgment, to carry out the principle in the case of young women, in whom maternity is desired or may become possible. On the other hand, there is no doubt that the results in many of these cases are disappointing, and that subsequently the remaining ovary and tube must be removed in order to restore the patient to health.

Suspensio-uteri versus Shortening of the Round Ligaments. It will be observed that in four cases the round ligaments were shortened for retroversion or retroflexion of the uterus, whereas suspensio-uteri was done twenty-eight times, and of this number, in thirteen cases in which adhesions were absent, hysterorrhaphy was the only intra-abdominal operation performed. A reference to the tables will show that in twelve of the thirteen cases plastic operations were done at the same time. In other words, in the class of cases where either operation could have been done, the round ligaments were shortened four times, and suspension was done thirteen times. My experience has been very much greater with suspension of the uterus than with shortening of the round ligaments. I like both the operations very much, as the results obtained have been most satisfactory. In all of the cases in which I have shortened the round ligaments, the uterus remains in position. This does not include a case in which I attempted the operation and failed to find the ligaments—the first time in which I made the effort. Of the cases in which hysterorrhaphy has been done, so far as I know, not only in these reported to-night, but in all the previous cases in which I have operated, the uterus remains forward, exeept in two cases. In one case the patient had

a septic peritonitis, and it was necessary to reopen the abdomen to wash out the septic material, at which time the sutures through the uterus were removed and not reintroduced. This patient remains well, but her uterus is not attached to the abdominal wall. It was a case of procidentia, in which plastic operations were done, and then the adherent ovaries and tubes were removed and a hysterorrhaphy performed. One of the tubes had been transformed into a hydrosalpinx. The second case in which the uterus has not remained attached to the abdominal wall was one in which on the third or fourth day the bladder became overdistended and tore out the sutures from the uterus. This patient was apparently emptying her bladder, and deceived her nurses in this way. Attention was called to the overdistention by abdominal pain, which on investigation was found to be due to a bladder sufficiently filled to extend up to the umbilicus.

The relative merits of hysterorrhaphy and shortening of the round ligaments is a question which merits attention. In my judgment, the field of suspension of the uterus is very much wider than that of shortening of the round ligaments. The latter operation should be limited to those cases of retroversion or prolapse of the uterus, in which the uterus is freely movable and the broad ligaments so flaccid as to assure the examiner that adhesions are absent or of a very trifling character. This last clause is added because adhesions of a very trifling character cannot be recognized by bimanual examination. Really the operation should be limited to cases in which adhesions are absent. On the other hand, suspension is applicable not only to this class of cases, but to cases in which adhesions more or less dense exist as a complication of the retroflexion or prolapse of the uterus. My preference is to shorten the round ligaments in cases having no adhesions, if the patient is young and liable to become pregnant, as I believe that pregnancy and labor are less likely to be interfered with than is the case when the uterus is attached to the abdominal wall. Hysterorrhaphy must be employed whenever there are adhesions, and oftentimes when there are none. For example: Of the twenty-

eight hysterorrhaphies reported to-night, twelve have been done in cases of procidentia or retroflexion of the uterus, in which plastic operations were also performed upon the same patient at the same sitting. In all such cases I prefer hysterorrhaphy, because of the much shorter time which is required for its performance. Ten or fifteen minutes suffice for a carefully performed hysterorrhaphy; whereas it requires at least three-quarters of an hour to shorten the round ligaments. The interests of the patient are best subserved by selecting hysterorrhaphy in cases in which it is necessary to do a number of operations upon the same patient on the same day.

In parallel cases, in my judgment, the risks of the two operations are about the same. In a well-conducted clinic the mere opening of the abdominal cavity is in itself a risk so slight as to be scarcely appreciable. Moreover, in shortening the round ligaments, not infrequently the peritoneal cavity will be opened, and not only once but twice. I have a number of times torn the peritoneum in both inguinal canals when stripping it off from the round ligaments; therefore, even this slight risk is not necessarily avoided in the operation of shortening the round ligaments. In my judgment its advantages are that it is less apt to interfere with the pregnancy of labor, and its disadvantages as compared with suspension of the uterus consist of the increased length of time necessary for its performance, and the fact that occasionally adhesions are overlooked, which may subsequently require an abdominal operation to relieve pain, caused by putting them on the stretch when the uterus is brought forward.

It will be observed that in no case has vagino-fixation of the uterus been performed. This operation, of German origin, has not impressed itself favorably upon me. That much can be said in its favor I am prepared to admit, but am too well satisfied with the results obtained by hysterorrhaphy and by shortening of the round ligaments to choose it in preference.

Suturing the Abdominal Incision. Hernia. There have been three post-operative herniotomies for ventral hernia. One of these was in a patient upon whom I had operated for a rup-

tured tubal pregnancy, using drainage and the through-and-through suture. The second was in a patient upon whom I had operated for a suppurating ovarian tumor communicating with the rectum, the patient being at the time greatly prostrated from long-continued suppuration and septic absorption. At the first operation the suppurating tumor was removed by peeling it out of its bed, and when removed there was no point requiring a ligature. The patient was so profoundly shocked at this time that the opposite appendage was not examined. Gauze and glass drainage was used, and the through-and-through suture. Both of these patients belong to the class which are apt to develop hernia. They are prostrated at the time of operation, so that this has to be hurriedly performed, drainage must be used, and the suturing of the abdominal wall done in a very imperfect manner. Everything has to yield to the necessity for shortening the operation to the utmost possible degree, otherwise the patient dies from shock or sepsis, the latter being very much more apt to develop in a prostrated patient. I always tell such patients that they should feel rather glad that they have a hernia, as had they not recovered from the operation they would not be bothered with it. The third patient had been operated upon in another hospital, for adherent appendages, the adhesions having been broken up with the idea that a cure would result. On the contrary, the adhesions reformed, and the patient suffered not only from retroflexion of the uterus and adherent and diseased appendages, but from a hernia in addition. At the first operation, I believe, through-and-through suturing was employed. In the second case, a thin-walled ovarian tumor was present, and this together with the retroflexed and adherent uterus was removed. In the third case, the diseased and adherent appendages, together with the retroflexed and adherent uterus, were removed.

These three cases of hernia are reported in order to refer to the method employed in closing the abdominal wall, which is applicable not only to cases of post-operative ventral hernia, but also to the abdominal incision in all cases of cœliotomy in which abdominal drainage is not necessary. This method of sutur-

ing has been employed for three and a half years, in about 200 cases, with the result that not a single hernia has presented itself.[1]

The method of suturing referred to is to bury a row of silkworm-gut sutures at the level of the aponeurosis, thus closing the peritoneum, sub-peritoneal fat, recti muscles, and aponeurosis. The edges of the aponeurosis are brought together under the guidance of vision, which I believe is the secret of the success of the method in preventing hernia. The skin and subcutaneous fat are then brought together by superficial sutures introduced down to the aponeurosis, so that dead spaces shall not be left in the abdominal wall. If proper asepsis is maintained, suppuration is an extremely rare accident. The method was employed for over two years without a single suppuration, when two patients operated upon the same day suppurated. In other words, on that day somebody's hands were not clean, or the suture material was not properly sterilized. My results with this method of closing the abdominal wall have been so satisfactory that I am not tempted to change it. It has been proposed to substitute silver wire for silkworm-gut, and this has been done by various operators because of the suppurations which occurred with the silkworm-gut. This, however, is purely a question of asepsis, and if this can be maintained there will be no occasion for a variation in the technique. The use of non-absorbable buried sutures, I believe, is original with Schede,[2] of Hamburg, and has been employed more especially by Edebohls and myself in this country. My experience with it is now sufficient to enable me to claim that by it herniæ after abdominal section can be reduced practically to the vanishing point.

[1] To be absolutely exact, I should report that in a case of tubercular pyosalpinx and tubercular peritonitis, in which the method was used, the incision became infected, and all of the sutures were discharged. In this case a hernia formed about one year after the operation. In the second case an umbilical hernia in a very stout lady was operated upon, and the pillars of the ring were brought together by this method of suturing. About a year after the operation a hernia appeared to the left of the line of suture. It is scarcely necessary to point out that the object of the suturing was defeated by suppuration in the first case, and that the conditions are essentially different in umbilical hernia from those which obtain in abdominal section in general.

[2] Schede uses silver wire for buried sutures, and, in addition, uses a through-and-through wire suture, which is removed.

Abdominal Hysterectomy. Thirty-seven abdominal hysterectomies were performed. Sixteen abdominal hysterectomies were for fibroids. In these 16 cases the following complications were met with:

In 1, malignant degeneration.

In 1, an ovarian cyst.

In 1, an ovarian cyst with unruptured tubal pregnancy-fœtus.

In 1, bilateral pyosalpinx.

In 1, a par-ovarian cyst.

In 3, unilateral hydrosalpinx.

In 2, bilateral hydrosalpinx.

In 1, calcareous and cystic degeneration.

In 1, bilateral salpingitis with dense adhesions.

Of these patients, 1 died.[1]

The remaining 21 abdominal hysterectomies were done for the following conditions:

1 ovarian tumor, retroflexion of the uterus and adhesions.[2]

1 unilateral pyosalpinx, salpingitis and retroflexion of the uterus.

4 bilateral pyosalpinx.

1 bilateral pyosalpinx and suppurating ovarian tumor.

1 bilateral hydrosalpinx.

1 bilateral ovarian tumor.

1 retroflexion of uterus, prolapsed and cystic enlarged ovaries.

1 cirrhotic ovary and incurable metrorrhagia.[3]

1 bilateral hæmatoma of ovaries, salpingitis and adhesions.

8 bilateral salpingitis and ovaritis, with retroflexion of the uterus and adhesions.[4]

1 suppurating left intraligamentous ovarian cyst, containing one gallon of pus, and right hydrosalpinx; uterus removed on account of oozing from its ragged surface.[5]

Hysterectomy versus the Removal of the Uterine Appendages. Special attention should be called to the fact that hys-

[1] See fourth death.

[2] The other ovary had been removed for a suppurating tumor. See under herniotomies.

[3] This patient had had one ovary removed four years before.

[4] One died. See fifth death.

[5] See sixth death.

terectomy, instead of the usual operation of the removal of the appendages only, was performed in 21 cases. In 11 of these the uterus was retroflexed, and in 10 adherent. Formerly in these cases of "retroflexion and adhesions," after the removal of the uterine appendages and the separation of all adhesions, either a hysterorrhaphy would have been done or the chance would have been taken that the uterus would again become fixed in retroflexion. When the condition of the patient is fairly good, I believe it to be better practice to remove the uterus along with its appendages in these cases, rather than to do a hysterorrhaphy or to allow the uterus to drop back in the pelvis. One of the patients so operated upon died,[1] but a study of the case will afford convincing evidence that the death was due to operation upon a hot day, and not to the fact that a hysterectomy rather than the mere removal of the uterine appendages was done. The two chief advantages of hysterectomy in this class of cases are: 1. That in a certain percentage of them drainage, which would otherwise be necessary, can be dispensed with, thus promoting the subsequent comfort of the patient by reducing the risks of hernia. 2. That the uterus is not left attached to the abdominal wall, with its ragged posterior surface, to become attached to the bowels, and thus to favor subsequent abdominal pain from adhesions.

In the remaining 10 cases in which hysterectomy was done instead of the removal of the uterine appendages, in some the uterus was removed in order to permit the ligation of both uterine arteries, and thus to control oozing either deep in the pelvis or from the surface of the uterus itself. In other cases the uterus was removed so that the ragged surface behind the broad ligaments could be covered over by the peritoneum dissected from the anterior face of the uterus and the broad ligaments. In this way drainage can frequently be dispensed with, when otherwise it would be necessary.

Hysterectomy was done in this class of cases twenty-one times, and the uterine appendages alone were removed twenty-seven times.

[1] See fifth death.

My own experience has been different from that reported by many operators, as to the permanent result of the removal of the uterine appendages, especially as to disagreeable sequelæ. It is claimed by many operators that in the large percentage of cases, if the uterus is left behind after the removal of the ovaries and tubes, the patients are not restored to health; that they continue to suffer from pelvic pain, hemorrhages, or other symptoms, which render their condition either no better than before their operation, or perhaps even worse. About a year ago I investigated the results obtained in my early cases, about 80 in number, who had been operated upon long enough to judge of the ultimate result obtained, and found that in only 4 of them were unfortunate sequelæ present. This is about 5 per cent. One of the 4 had metrorrhagia, because a portion of one ovary was not removed. Two suffered from pelvic pain of a similar character to that for which the operation had been done. Both of these patients had been chronic invalids for years, and the operations were undertaken with the expectation of benefiting them by doing away with menstruation, rather than of making a perfect cure. It will not gratify the advocates of hysterectomy to know that at the solicitation of one of these two patients her uterus was removed, and that she continues to suffer exactly the same pain as before. Her general health improved very much after the first operation, and instead of being bedridden she is now able to do the greater part of her domestic duties; but the removal of the uterus did not modify the pain which was left after the removal of the appendages. The other similar case has been lost sight of. The fourth patient had a gonorrhœal intraperitoneal abscess with double pus-tubes, and still has a gonorrhœal endometritis.

While I do not accept the argument as valid, that the uterus should be removed with its appendages, because if left behind it will almost surely render the patient an invalid, I do believe that in many of these cases it is desirable to remove the uterus along with the ovaries and tubes. From my standpoint, what is gained by hysterectomy in these cases is that oozing can be much better controlled if both uterine, as well as both ovarian,

arteries are tied, and that a very considerable part of the raw surface left after the separation of adherent appendages can be covered over by the flap of peritoneum dissected off from the front of the uterus and broad ligaments. In this way drainage can be dispensed with in many cases when otherwise it should be employed, and the number of herniæ following such operations can be greatly reduced. Post-operative intestinal adhesions also, I feel confident, will be less common than after the older operation; and the reason for this is quite apparent. A gain is made by removing the uterus itself, also, in cases of long-standing chronic metritis, with a large infiltrated uterus. Such a uterus, when left behind after the removal of the ovaries, can keep up reflex symptoms.

Abdominal versus Vaginal Hysterectomy. A reference to the tables will show that whereas abdominal hysterectomy has been performed thirty-seven times, and the uterine appendages only have been removed twenty-seven times, vaginal hysterectomy has been performed but twice. The advocates of vaginal hysterectomy, as an improvement upon abdominal section, for the removal not only of cancerous uteri, but also for small fibroids, certain ovarian tumors, and for the inflammatory and suppurative diseases of the uterine appendages, will naturally claim that the interests of these women would have been better subserved had vaginal hysterectomy rather than abdominal section been done upon the great majority of them. They advocate vaginal hysterectomy rather than cœliotomy upon the following grounds: 1. That after vaginal hysterectomy there are no ventral herniæ. 2. That the primary mortality is less than that after cœliotomy. 3. That the ultimate results are better than after cœliotomy. 4. That the convalescence is shorter than after cœliotomy. 5. They claim also that vaginal hysterectomy is especially indicated in the worst cases of pelvic inflammation and suppuration, because that by it the barrier of adhesions formed by peritonitis, which shuts off the general peritoneal cavity from the pelvis, is not broken down by the operation done from the vagina.

I wish only to point out that however much truth there may

be in the claims now made for vaginal hysterectomy, its advocates have as yet not established their position, and that they have very decidedly overstated its relative merits. They have insisted very strongly upon the great frequency of ventral hernia after cœliotomy. The results of those who employ non-absorbable buried sutures, as illustrated by my own report to-night, show that while there is something in this claim, that after all it is of small and relative, rather than of absolute importance. Moreover, it may be found that the percentage of vaginal herniæ, which develop after vaginal hysterectomy, is not very dissimilar from that of ventral hernia.

The question of primary mortality is largely a personal matter, and depends upon the skill of the operator, and upon his judgment in the selection of cases for operation. These factors are again influenced by the conditions which he can control in the clinic in which he operates, and also by his selfishness or unselfishness, as to whether he considers the good of his patient, or merely the piling up of statistics embracing a low mortality; and even here I believe the advantage lies with cœliotomy. This is indicated by contrasting the mortality of vaginal hysterectomy as given by Jacobs (*Amer. Gynec. and Obstet. Journ.*, June, 1895, pp. 744–896), of Brussels, 4.2 per cent., with that of abdominal hysterectomy given by Baldy, 2.7 per cent., and by the known results obtained by Kelly, between 1 and 2 per cent., and that reported by myself.

The claim that the ultimate results obtained after vaginal hysterectomy are better than after cœliotomy is one which I doubt, and which has to be proved by time rather than by argument. I wish merely to point out in this connection that it is admitted that when vaginal hysterectomy is employed, it is necessary in many cases to do partial or incomplete operations, leaving behind ovaries or parts of ovaries, pus-tubes or parts of pus-tubes, and depending upon drainage to effect a cure, This claim and admission will hardly convince those who have been accustomed to remove completely diseased organs by abdominal section, and who have seen the bad results following incomplete operations.

A great deal is said of the advantages of vaginal hysterectomy because after it women can be made to sit up as early as one or two weeks after operation; whereas, abdominal surgeons advise their patients to remain in bed from three to four weeks. This argument when investigated is a very weak one, because patients are not well within one or two weeks after vaginal hysterectomy. Their pelvic wounds are not even healed up, and oftentimes even longer after an operation the sloughing processes have not been completed, but give rise to foul, stinking discharges. No surgeon of experience will accept the claim that such patients are well because they can be forced out of bed at this time. One is inclined to suspect that the hygiene of hospital wards makes it desirable that these patients shall be urged to return home at the earliest possible day. When it is recalled that the nutrition of many of these patients is profoundly depraved, and that their nervous tone is in a similar condition, it will be admitted that a rest in bed even longer than three or four weeks, under good hygienic conditions, and with good food and nursing, is a most valuable factor in restoring them to health.

The final claim that vaginal hysterectomy is especially valuable in the more severe cases of pelvic suppuration, because it does not break down the barrier which shuts off the pelvic disease from the general peritoneal cavity, is unquestionably fallacious. Every abdominal surgeon knows by practical experience that it is extremely rare to meet with a case in which both uterus and appendages are absolutely buried beneath a wall of adhesions. At some point the uterus or the uterine appendages are in relation with the general peritoneal cavity; therefore, whether vaginal or abdominal hysterectomy be done in these cases, the barrier between the pelvic disease and the general peritoneal cavity is broken through. Whatever advantage the method has, it must not be claimed that it permits the removal of the pelvic disease without opening the general peritoneal cavity.

Heretofore in this class of cases, I have with one exception always operated from above, and have removed completely the

diseased structures. I have become convinced, however, that it is better surgery to drain these cases by the vagina, by making an incision into Douglas's Pouch, and breaking up the pus-sacs with the finger, either making an abdominal section to assist in the manipulation or not, as may be indicated in the particular case. In this way the barrier can be preserved between the pelvic disease and the general peritoneal cavity. Drainage will permit these patients to recover from their septic state, and later they can be operated upon for the removal of diseased structures if necessary.

I by no means believe that the questions at issue concerning abdominal *versus* vaginal operations have been settled. Like all problems in medicine, they will be settled by the combined experience of the profession, after sufficient time has elapsed to determine definitely the advantages and disadvantages of both methods. I am not inclined, however, to believe that vaginal hysterectomy has a large field—certainly not unless improvements are made whereby operations attempted by this method can be performed with certainty, and the present necessity of doing incomplete operations is overcome. When the vagina is roomy and the adhesions not too dense, undoubtedly the operation is entirely feasible from below, but in this class of cases very many patients require plastic work in the vagina. In such cases the abdominal route offers the advantage that both the plastic and the abdominal operations can be done at the same sitting. When the vagina is narrow and the adhesions dense and perplexing, vaginal hysterectomy is rather a demonstration of how by great perseverance and hard work extreme difficulties can be overcome, than an exhibition of the skill of the surgeon in dealing with the complications encountered, and does not compare at all favorably with operation by the abdominal route. The abdominal route offers great advantages in dealing with cancer of the uterus, inasmuch as in this way very much more of the broad ligaments and other tissues surrounding the uterus can be removed. This is especially true if bougies are placed in the ureters, as this permits the removal of very much more

tissue than is otherwise possible without injuring these structures.

In conclusion, I wish to point out that a resort to the vaginal method of operating could not have improved the results in the cases reported in this paper. The second and fourth deaths were in cases in which the vaginal method of operation was not applicable. One was a case of abscess behind the cæcum, from appendicitis. The other was a case of fibroid tumor extending far above the level of the umbilicus, in which the pelvic portion had undergone calcification, the upper part being cystic. The first and third deaths occurred in patients having general septicæmia at the time when they were operated upon. I can see no ground for the belief that a fatal result would have been averted had the vaginal method been employed. The fifth death occurred from heat-stroke. On the other hand, we do not know how many deaths would have resulted had the vaginal method rather than the abdominal been used. In addition to this aspect of the question, I have no doubt that the results are very much better than they would have been had the vaginal method been employed. Complete operations have been done in every case, which would not have been the case with the use of the lower method. In addition, I can report that not in a single case were fistulæ of the bladder or bowel caused by operation. In two cases bowel fistulæ were present at the time of operation. In one of these a cure has resulted, and in the other the fistula is gradually closing. This is a decidedly better showing than that obtained by the vaginal method. Finally, there is the certainty that these patients will not suffer from recurrent attacks of peritonitis, due to diseased tubes left in at the time of operation, or from tumors or abscesses of ovaries left behind as a result of incomplete work.

DISCUSSION.

Dr. E. E. Montgomery: I have listened with a great deal of pleasure to the excellent *résumé* that Dr. Noble has presented of his work at the Kensington Hospital for Women, and with the greater portion of what he

has said I fully coincide as to his estimate of the value of the measures he has advocated. His records are remarkable for their small mortality, and his report is full of interest.

There are certain portions of the paper which are worthy of fuller discussion, and I will refer first to fixation of the uterus and shortening of the round ligaments. You will notice that the majority of the cases reported have been by utero-fixation rather than shortening the round ligaments, and the reason that is given for this is the possible slipping of the round ligaments after the operation and the possible existence of adhesions of the uterus. For my own part, I would prefer the operation of utero-fixation to shortening of the round ligaments, because by this method you are able to discover the actual condition of the uterus and ovaries, and in case infection should occur there is only one wound instead of two. In case of slipping of the round ligaments they would carry infection into the abdomen, with all the dangers of infection of the peritoneum. Shortening of the ligaments may be preferred where the woman has borne a number of children and the abdomen is so relaxed that a large and heavy uterus would find no support and would fall back, dragging the adherent wall with it. In such cases the Alexander operation would seem to offer special advantages.

With regard to vaginal fixation, I have done this operation in a few cases, and my experience leads me to agree with what Dr. Noble has said about it. The advantage is the absence of scar upon the abdomen, which in some cases is important to consider. But in those cases where the uterus is large and heavy, and causes distress by dragging upon the bladder, the distress will be aggravated by vesical fixation.

Now, with regard to removal of the uterus. In the great majority of cases, where the necessity arises for the removal of the tubes and ovaries, infection has occurred through the uterus. After their removal there is a decrease in the size of the uterus, and the fibroid changes which occur give rise to local conditions of disease, for which a subsequent hysterectomy has been called for. I can recall histories of cases of distress after operations, due to adhesions which had formed in the vicinity of the uterus, where the removal of the uterus has relieved all the distress of the patient. I have seen cases also, of marked hysterical character, where the patient has been confined to bed for a long time after removal of the tubes and ovaries, and removal of the uterus has enabled them to get up, with relief of all their symptoms.

We all see patients who still suffer from pains, no matter what has been done for them, and who, getting tired of going to one physician, will consult another, who will conclude that the operation was a failure, whereas the first physician, not seeing his patient any more, naturally regards it as a success.

With regard to the operation of vaginal hysterectomy as compared with the abdominal procedure Now, I do not want to be understood as advocating the vaginal operation to be done in all cases. Yet there are cases in

which the vaginal operation can be done more quickly and with greater ease than the abdominal operation. The advantage consists in having only one peritoneal wound, with less liability to septic inflammation. There is also no danger of ventral hernia. The wound is also in a most favorable position for drainage, while in abdominal section the drainage is upward against gravity. Another advantage is the readiness with which hysterectomy can be done by the vaginal method; except in old cases with many adhesions, the operation can be done with equal facility through the vagina as through the abdomen. The results of experience teach that the cases must be selected. Thus I would not advise the vaginal operation to be done through a narrow, undilated vagina in an unmarried woman, where there are adhesions and the uterus is large. In such a case the abdominal procedure is safer. I was glad to hear Dr. Noble in certain cases advocate vaginal drainage after operations. I am satisfied that life can be prolonged by operating through the vagina, which otherwise would have been lost by the operation through the abdomen. With the exception of this, I have nothing but commendation for the paper which Dr. Noble has just read.

Dr. G. G. Davis: Dr. Noble has referred to cases of hernia occurring after abdominal operations. It would be interesting to know results in a considerable series of cases after cœliotomy, with reference to this point. From talking with those who do these operations most frequently, one would conclude that these hernias are very rare; but in talking with the truss-makers, one is told that they believe hernia to occur eventually in nearly all of them. Now I do not think this latter is the case; but I do believe that hernias occur more frequently than is generally supposed, and that a large abdominal incision will very likely be followed in time by hernia. I am glad to see that Dr. Noble uses as a buried suture my favorite—silkworm-gut. The tendency at the present day, by surgeons, is to prefer the terrace-suture, bringing together successive layers of the wound rather than uniting it by a simple through-and-through interrupted suture.

I heard one truss-maker say that he had six or seven post-operative abdominal hernias call upon him in one day, and a friend stated to me that while he was there two cases of the kind came in, which went to show the truth of the statement. I think that after opening the abdomen we should when possible take time to close thoroughly the wound. In unfavorable cases, as in operations for acute appendicitis, it may be necessary to shorten the operation and get through as soon as possible to save life, and, therefore, a hernia after such should not be considered a reproach to the surgeon; but, wherever possible, the abdominal wound should be brought together in layers and closely stitched together, and not simply united by the through-and-through interrupted suture.

Dr. George Erety Shoemaker: In regard to the method of introducing the superficial sutures mentioned in the paper, I may say that I have adopted for some time the method of which Dr. Noble has spoken, with

entire satisfaction. There is no difficulty about getting silkworm-gut to remain in the abdominal wall permanently. It does not produce irritation, in such cases, as a buried suture; but where a drainage-tube must be employed, buried sutures should not be used. When used in structures such as Dr. Davis has spoken of, silk has almost invariably given trouble. My observation has been that, where the silk is buried in such highly vascular structures as the broad ligament or the uterus, it is well taken care of; but where it is buried in such poorly organized structures as the strong fascia about a hernia it is likely to produce trouble after the lapse of weeks or months.

I think that we owe Dr. Noble thanks for the admirable presentation of moot questions which are attracting considerable attention at this time. The question of penetrating the peritoneal cavity through the vagina, in cases of large, suppurating collections of fluid in the abdomen, has been considered. I think that the profession is gradually coming to a conclusion that this is an expedient of value in desperate cases for temporary relief, at least. I have recently had a case which convinced me of the advantage of this method of opening the abdomen. When the patient is in such a profoundly septic condition that a section cannot be done, this may be the only way in which the life of an apparently dying woman can be saved. It should be stated that cases are often sent to a hospital to save the physician from signing a death-certificate, and these are not favorable cases to operate upon by any typical method.

ON THE TREATMENT OF THE SAC IN OPERATIONS FOR THE RADICAL CURE OF HERNIA.

By GWILYM G. DAVIS, M.D., M.R.C.S. (Eng.),
SURGEON TO THE GERMAN AND ST. JOSEPH'S HOSPITALS, PHILADELPHIA.

[Read November 6, 1895.]

The changes which have recently been suggested and tried for the radical cure of both inguinal and femoral hernias have been so numerous, and have followed each other so quickly, as to compel one to regard the end desired as yet some distance off. As any method of procedure is apt to be merely a temporary one, and as the experience of one individual will hardly suffice to settle disputed matters, it has appeared to me desirable to submit at once for trial a mode of treatment of the sac which I have found to be at least practicable as to its performance, and which may possibly prove acceptable to others. A fundamental question which presents itself in operating for radical cure of hernia is whether the sac shall be utilized or cut away. The most recent operators, as Halstead, Bassini, Marcy, and Barker, following Czerny and Banks, have ligated or sewn shut the neck of the sac and removed it. Others, as Macewen, Packard, and Kocher, have retained the sac as a plug, the first two folding it on itself and placing it external to the peritoneal cavity between the peritoneum and the muscles; the last twisting and suturing it over the line of the inguinal canal.

Ferguson,[1] appreciating, as do those last named, the desirability of retaining the sac, advocates the combining of Macewen's method of treating it with, practically, Halstead's method

[1] Annals of Surgery, May, 1895, p. 547.

of closing the canal and disposing of the cord. The use of the sac certainly does afford additional tissue to act as an obstruction to the recurrence of the hernia, and for that reason it should, if possible, be employed, no matter what plans are used to close the muscular and tendinous defects. If the sac is well isolated and drawn down and then ligated or sutured, it does firmly close the opening in the peritoneum through which the hernia has come. It also obliterates the infundibuliform process and leaves the interior surface of the peritoneum smooth and free from any marked depression. In this respect, ligation of the sac appears to have an advantage over the methods of Kocher and Macewen, in which the peritoneal opening is closed either by carrying the sac first upward and afterward twisting it, as does the former, or by simply folding the sac on itself as does the latter. The total constriction of the neck of the sac by suture or ligature and retaining it to act as a plug is objectionable; because, having been isolated from the surrounding tissues, its nourishment is cut off, and it may slough or cause disturbance in the healing of the wound, and even if it does heal properly, it is liable to quick atrophy. The following method was devised to avoid these objections: In inguinal hernia the sac is to be isolated, opened at its extremity, and the contents returned to the abdomen. The index-finger of the left hand is then introduced into the sac until the tip reaches its neck, the end of the sac being grasped by the thumb and remaining fingers. To aid in the further manipulations three hæmostatic forceps are fastened to the abdominal continuation of the sac a short distance away from the finger, one being on each side of the finger and one behind. A curved needle threaded with stout silkworm-gut is then passed in and out three times, encircling the neck of the sac, carefully avoiding as much as is possible including the bloodvessels of the sac, as high up as it can conveniently be placed, in such a manner as to form a purse-string suture surrounding the neck of the sac. The passing of this suture is guided by the finger within the sac, and only half of the circumference of the sac is constricted by the suture; because as each stitch emerges it skips as much

of the sac as was included in the previous stitch. If necessary, the needle may be introduced more than three times. This stage of the operation is shown in Fig. 1. The finger is now withdrawn from the sac, and an assistant makes pressure above the neck to prevent the descent of the intestines. Should the sac be very large any excess not desired may be cut off; I have retained about ten centimetres (four inches). The retention of a greater amount increases the liability to sloughing.

The distal end of the sac is then transfixed with a needle and stout piece of catgut, the end of which is tied, the remainder being allowed for the present to remain. The extremity of the sac is grasped with a pair of long forceps, and, while the neck is held by the three hæmostats previously applied, it is inverted like the finger of a glove, and pushed its full length into the peritoneal cavity. An assistant now ties the silkworm purse-string suture around the neck of the sac and forceps, as shown in Fig. 2. The forceps being withdrawn the silkworm-gut suture is firmly tied in a reef-knot and the three hæmostats removed. The hanging end of the catgut liga-

ture is now pulled down and fastened by a couple of stitches in the tissues ; thus the sac is folded on itself in a mushroom-like form on the interior of the peritoneal cavity, as shown approximately in Fig. 3. The two ends of the purse-string silkworm-gut suture, are then threaded with needles, passed through the muscles above, tied and cut short. The remainder of the operation can be completed by the method of Halstead or any other that may be desired. By this means the folded sac is fixed as a pad on the internal surface of the peritoneum. I

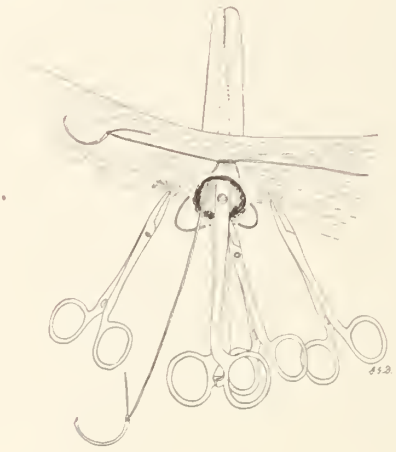


FIGURE II.

FIGURE III.

do not believe, as has been held by some, that it will act as a wedge to favor the descent of the hernia, but rather as an obstruction to shift the pressure of the gut to some more healthy spot. In order to favor the agglutination of the pad to the abdominal walls, I have scraped the interior of the neck of the sac previous to inverting it, thus promoting the effusion of lymph. It will be observed that the purse-string suture, applied as described, does not constrict the whole circumference

of the neck of the sac, but only half of it. Not more than half of the total length of the suture is buried, the remaining half of the neck of the sac being left uncompressed, so that through it the folded sac is enabled to obtain nourishment. By this means we close the neck of the sac as effectually as by ligating, and still have as free a field for the closure of the muscles, while we retain such advantages as the use of a pad formed by the sac can give.

In closing the opening in the muscles by Halstead's method the muscular tissue of the deeper lying transversalis and internal oblique muscles projects upward, and is apt to separate for quite a distance the fibrous expansion of the more superficial external oblique, and it will be an advantage to adopt Bassini's method of suturing the external oblique separately while still retaining Halstead's method of treating the cord.

In operating for femoral hernia it is still more necessary to preserve the sac than in inguinal. It is almost our only way of offering any effective obstruction to the descent of the gut. In it also I have treated the sac as already described, and in addition brought up a flap of pectineus muscle and sutured it to Poupart's ligament, as suggested by Watson Cheyne. This was followed by three buried silkworm-gut sutures which passed through the pectineus muscle, then across the vessel to the deep and superficial structures forming the upper and inner edge of the saphenous opening, and through Poupart's ligament on which the upper two ones were tied.

The closure of the femoral canal is a somewhat unsatisfactory procedure. The pectineus muscle is so soft and friable as to be almost, if not quite, useless as a means of closure. The fascia covering it in a recent case was so thin as to be practically absent. This leaves almost nothing with which to form a suitable barrier, and our main reliance must, at least until something better is devised, I think, be placed on plugs formed by the hernial sac and simple closure of the canal with a plain circular suture.

The comparative values in operating for the radical cure of femoral hernia, of the above method and of that of Macewen, as

elaborated by Cushing, is for the future to decide. The dearth of material wherewith properly and efficiently to close the femoral canal is so great that I would be inclined in future cases to chip off a portion of the adjacent pubic bone and fix it in such a position as to block up the canal. In this it would be aided by the effusion of callus.

Of the use of kangaroo-tendon as a buried suture I am somewhat suspicious; what has become of it in those cases in which it has been left buried in the tissues I do not know, but in almost every one where it has been used for the subcutaneous suture the protruding ends have been found at the expiration of ten days to be almost or quite dissolved from the part remaining in the tissues. This does not speak well for its permanency. Silk as a deep suture material I also have not full confidence in, and for the present I pin my faith to silkworm-gut, with a possible resort to silver wire in case of dire necessity.

DISCUSSION.

Dr. Richard H. Harte: I have listened with much interest to the description of this ingenious method of operating for radical cure of hernia proposed by Dr. Davis, and also to his remarks upon the treatment of hernia in general. With regard to the difficulty in the radical cure of femoral hernia, I entirely agree with him. There is a great dearth of means for closing the crural canal. The plug is about the only means left to us for this purpose. The suggestion made by him to chip off a portion of the pubic bone certainly deserved consideration. The proposition has been made to detach a portion of periosteum from this bone, stitch it down to the crural ring and have it serve as a barrier. The objection to the plug (method of Macewen) very often is that there is a liability to constriction by the sutures, which causes a tendency to sloughing, which has happened in a number of cases. Again, I do not think that any plug, no matter which shape, will entirely correct the tendency to hernial recurrence. The amount of support afforded the peritoneum by such a mass is very little. The support must depend upon the abdominal muscles, in order to form any permanent obstruction to recurrence of the hernia. I think that the method of Dr. Davis is ingenious, one of the important points being the suture of the peritoneum, which is likely to give a perfectly smooth surface.

As to the use of kangaroo tendon, I must say that I am rather partial to this suturing-material, as my experience with it has been very satisfactory. Of course, it is important to get a good quality of the tendon, as some of it which is offered for sale is very inferior, and worth very little. A preparation made by a firm in New York has been the most satisfactory of any that I have seen or used. Silkworm-gut I do not like to leave in the tissues, as I think it is liable to cause irritation and work itself out to the surface. Anyone who has a suture of silkworm-gut in his abdominal wall is liable to feel it constantly, and will notice this tendency to work to the surface and cause irritation.

Dr. Charles P. Noble: I shall not discuss Dr. Davis's paper, as I entered the room after he had finished it. I will, however, say a word about the use of buried silkworm-gut sutures. I have been using the silkworm-gut in the abdominal wall for the last three or four years, and not a single one has given rise to irritation or worked its way to the surface when the wound healed by first intention. With regard to the sensation of the patient and his consciousness of its presence, I will say that I have three such sutures in my own abdominal wall, where they have been for the past year, and that I have no consciousness of their presence whatever.

Dr. Davis: I recognize the fact that the silkworm-gut is not an ideal suture, but I regard it as the best that we have at present. The real objection to the method is that which was mentioned by Dr. Harte; that is, the possibility of sloughing of the sac. I have not had any sloughing in my cases, but others possibly may have it. I have known of two cases of Kocher's operation in which sloughing occurred. I think that it is avoided in my method by putting in the stitches as I have described, at different points around the circumference of the ring, so that when the ligature is secured it does not constrict the entire neck of the sac; there is not enough constriction to stop the circulation caused in this way. In inguinal hernia, I believe that the remains of the sac, secured as described, does offer some slight obstruction to the future descent of the hernia. In femoral hernia I think that the ideal operation has not yet been decided upon, but this method offers to those who wish to make a trial of a new way of utilizing the sac an opportunity so to do.

SOME SALIENT POINTS IN THE DIAGNOSIS, PATHOLOGY, AND TREATMENT OF APPENDICITIS.

By JOHN B. DEAVER, M.D.

[Read December 4, 1895.]

Appendicitis, owing to its unusual frequency and alarming gravity, has become the most important intra-abdominal inflammation which the surgeon encounters at the present time. Occupying this position, the subject is one worthy of the gravest consideration, and sufficiently warrants the presentation of a few facts which I have learned in the careful study and treatment of a large number of cases.

As many of these points have not been brought to the attention of the medical profession, I desire to emphasize them as much as possible, and give to them the prominence which I feel they deserve. I refer most particularly to the early recognition of the varied symptoms of appendicitis, a proper appreciation of the possible disastrous results of such a morbid process, and the prompt application to all such cases of the most advanced surgery. I believe the time has arrived when those of us who have had the opportunity of observing and operating upon a number of cases of appendicitis should declare ourselves without fear and without reservation concerning the operative treatment.

A glance backward over a period of eighteen months shows that there has been a decided wave of progress in the diagnosis and treatment of appendicitis; there has been developed a keener appreciation of its dangers, and a more uniform accept-

ance of operative treatment than before. Many have been brought to justly realize, only through the school of a bitter experience, the gravity that a comparatively insignificant pain in the abdomen may suddenly assume.

A tempest of argument has been raised, a storm of protests has been hurled forth against what has been called too radical surgery, and, as a result, the sea of life is strewn with human wrecks, absolutely lost or crippled beyond repair.

It would be only charitable for us to believe that those who to-day, either by voice or action, place themselves in the ranks of conservatives on the question, have not encountered the experience of many others in the treatment of this disease. Their apathy is the result of an inexperience which underestimates its destructive tendencies. Unseen and frequently unheralded save by a few premonitory symptoms, like ripples on the surface of calm water, the deadly process begins, but as those ripples broaden so do the symptoms intensify until the whole body becomes agitated by the fury of the storm, and it becomes a question of life or death for some human being. I venture to say that among those present to-night there are some who can recall sad experiences with this foolishly styled "fashionable disease," appendicitis, in which the patient who was supposed to be the subject of an acute attack of indigestion, in a few hours showed unmistakable evidence of a purulent peritonitis which resulted in death, or, perhaps, the peritonitis was confined to the right iliac fossa, and terminated in an intra-abdominal abscess, which, when opened, the appendix not being removed, left the patient a chronic invalid from fecal fistula or subject to subsequent attacks, each one of which was attended by the awful uncertainty of death.

There are many cases in which inflammation of the appendix is so intense that it necroses, and either perforates or becomes gangrenous before there is even an attempt upon the part of Nature to protect the peritoneum against infection. This is so common an occurrence that I am compelled to bring you face

to face with the question, Can you, or I, or anyone, presume to say when or where this condition will arise?

In previous papers upon this subject I have laid stress upon the wisdom of early operation in acute attacks. A richer experience and a careful analysis of the knowledge required impel me to state again, in terms so strong that they cannot be misunderstood, that early operation is not only the safest, but the only sure road to recovery. Every case of appendicitis you see places you in the position of deciding immediately what is best to be done.

The patient's life and future usefulness frequently hang upon the slender thread of your judgment. You may say many cases get well without operation (that is, do not die from the attack); but should you rest content with a fair percentage of recoveries, when a much greater number would recover by operation?

I have been accused of being too radical upon the subject of appendicitis, of having removed normal appendices; but I have the courage of my convictions, and say to you that my statements are founded on facts, and that if I can convince one of you, who may be skeptical, that what I say is true, then have my time and labor been well spent. In support of what I say I can produce the statistics of two hundred operations performed between attacks, with two deaths, both of which deaths occurred in the first series of one hundred cases.

Diagnosis. I wish to emphasize a fact I have already stated in former articles, that is, that the diagnosis of appendicitis is an easy one to make. There are three cardinal symptoms which, when present, warrant without exception a diagnosis: the sudden onset of acute abdominal pain, with or without vomiting, occurring in one who was previously well; the rigidity of the right side of the lower abdominal walls; and tenderness over the site of the appendix.

It is not my intention to go over the entire subject of the diagnosis, the pathology, and the treatment of appendicitis, but, as the title of the paper suggests, to discuss some salient points not touched upon in the paper I read before the College

May 2, 1894, and which I hope will throw sufficient additional light upon this subject to clear the horizon for those who are still groping in the fog of uncertainty and doubt.

The affections with which I have seen appendicitis most commonly confounded are typhoid fever, pyosalpinx, ovarian abscess, pyonephrosis, abscess of the kidney, and perinephritic abscess. I cannot understand why appendicitis should be mistaken for typhoid fever, particularly in the early stage of either affection, and yet upon more than one occasion I have seen the surgeon forced to defer an operation because the consensus of opinion of the majority of the medical attendants was opposed to such a procedure. In the early stages of the two affections the characteristic symptoms are distinct. The sudden onset, the rigidity of the right lower abdominal wall, and the tenderness which is more marked and smaller in area, being limited to the position of the appendix, are pathognomonic of appendicitis. In typhoid fever the slow onset attended by lassitude, headache, nose-bleed, etc., the temperature-record, the general abdominal tenderness with the accompanying peculiar doughy condition of the abdominal walls, the enlarged spleen, and the absence of rigidity should be sufficient to establish a differential diagnosis with absolute certainty. If, in connection with these differential points, a digital examination of the rectum demonstrates a sensitive mass, then any doubt which may exist in the mind should be at once dispelled. Spots may be found in either affection, but they are not of any diagnostic value, as I believe that in both cases they are of septic origin.

Follicular abscesses of the appendix are responsible for some of the mistakes in the differential diagnosis between appendicitis and typhoid. The minuteness of the collection accounts for the mildness and the prolongation of the sepsis, and the lessened degree of the local symptoms. In this type of appendicitis we have a constant source of absorption with a small amount of tissue involved. It is not uncommon to find cases which have been supposed to be typhoid fever, in which an operation has demonstrated the presence of macroscopic follic-

ular abscesses in the appendix, varying in size from a millet-to a mustard-seed, an eroded mucous membrane, and a more or less infiltrated organ.

The difficulties in making a differential diagnosis between appendicitis and typhoid in the later stage are more fancied than real. The early history, the local symptoms on the one hand, and the general abdominal symptoms with dry tongue, the sordes on lips and teeth, the temperature-record, and the characteristic diarrhœic stools on the other hand, are quite sufficient to make the differentiation clear and distinct. The spleen is enlarged in both affections and is the result in both instances of sepsis. The enlargement, however, due to septic infection from an active suppurative process like appendicitis, is likely to be associated with pain caused by a perisplenitis from embolism.

The following case is related to illustrate the fact that follicular abscesses in the appendix are capable of causing a train of symptoms which suggest to the medical man the probability of typhoid fever:

One morning in the early fall my friend, Dr. M., called at my office, saying that he was worried about his little girl, who was ill, because the nature of the illness was not clear to him. He came to the city with the purpose of having one of our medical men see the child. He related to me the history of the case and showed me the temperature-record, and I suggested that the symptoms resembled those of subacute appendicitis. An appointment was made with the medical man and I was asked to accompany him. This being impossible, I suggested one of my assistants and Dr. F., of the German Hospital, who were accepted. The consultation was held, but a definite conclusion was not reached, as the medical consultant believed the trouble to be typhoid, while Dr. F. and my assistant thought it appendicitis. The following day I was asked to see the case, and to operate if I concurred in the diagnosis of appendicitis. This I unhesitatingly did, and operated at once. The following conditions were present: The appendix was situated behind the colon, to which it was adherent. The mucous lining of the tip of the appendix, which was club-shaped, contained several follicular abscesses, the largest of which was the size of a split pea. The recovery was uninterrupted and rapid; the symptoms which had suggested typhoid disappeared immediately after the removal of the appendix.

Before directing attention to the points of differentiation between appendicitis and the affections attended with pus-for-

mation, which may be confounded with appendicitis, permit me to say that the occasion for making a differential diagnosis between appendicitis with pus-formation and other forms of pus-collection should never arise, as in all cases of appendicitis the appendix should be removed before pus has formed.

Pyosalpinx and Ovarian Abscess. The presence in the recto-uterine cul-de-sac of an inflammatory mass in intimate relation with the uterus, which renders it partially or completely immovable, and which can be clearly outlined by vaginal or combined vaginal and rectal examination, in connection with the history of a vagino-uterine infection, establishes the diagnosis of a pyosalpinx or an ovarian abscess. The essential in the differentiation between these two affections and appendicitis is the absence of the history of the three cardinal symptoms of the latter affection.

This is, also, the essential point in the differential diagnosis between appendicitis and pus-affection of the kidney.

Too much stress cannot be laid upon the importance of urinary examinations, not only in the supposed kidney-affections before mentioned, but also in appendicitis. I have recently operated upon a case in which the urine contained pus and epithelium from the pelvis of the ureter, in which there was present a swelling in the right loin accompanied with tenderness, extending in the direction of the attachment of the appendix, and in which the history of the three cardinal symptoms was elicited. I opened up the right iliac fossa, finding the appendix, which was post-colic and contained pus pointing north, adherent to and in communication with the pelvis of the ureter, through which the contents of the appendix were being emptied into the bladder, thus explaining the urinary symptoms; the recovery was uneventful.

In certain cases of appendicitis the pain is entirely referred to the left side. I wish to emphasize this point, as I have seen a number of cases in which the attending physicians, who were familiar with general appendiceal symptoms, were totally misled. From my experience in operating upon a number of such cases, in which I invariably found the appendix holding a

southerly position, I am prepared to make the statement that when the pain is referred to the left side the appendix occupies the pelvis. Also, that in this class when suppuration has taken place, resulting in a large pelvic collection, there is pronounced bilateral rigidity of the lower abdominal walls. Therefore, when I am asked to see a patient, and the diagnosis of the ailment is not clear, with a previous history of the three cardinal symptoms, with the pain referred to the left instead of the right side, with a temperature denoting a hectic condition, and a bilateral rigidity of the lower abdominal walls, I am convinced that the case is one of suppurative appendicitis, in which both the pus-collection and the appendix occupy the pelvis. A rectal and vaginal examination under these conditions, with the exception of great pain, determines nothing but a sense of fulness. The contrast between this condition and that of suppuration in the pelvis dependent upon uterine infection, to which reference has been made, is marked. The following case will illustrate the importance of these diagnostic points:

During the past summer I was asked to see Miss ——, the history of whose illness was as follows: About two weeks prior to my visit she was suddenly attacked by what was at first supposed to be an attack of acute indigestion, which did not yield to the ordinary remedies. A provisional diagnosis of typhoid fever had been made, in view of the fact that the spleen was enlarged, spots were present, and the temperature was suggestive of an irregular case of typhoid. The suddenness of the onset, accompanied by acute abdominal pain with very decided bilateral rigidity of the lower abdominal walls, the temperature-record, the vaginal and rectal examinations, which elicited great pain, with the characteristic fulness only, pronounced the case one of suppurative appendicitis with a pelvis full of pus. I advised operation without delay. Adverse opinion of other counsel delayed the operation for a period of two days, at which time the pelvis was found to be full of stinking pus; the appendix, which was perforated and gangrenous, occupied the pelvis. The appendix was removed and the recovery was uneventful.

The citation of one case occurring in the person of a son of a physician, a most excellent diagnostician, will serve to illustrate the importance of the pain being referred to the left side,

as indicating the position held by the appendix, viz., the pelvis; the cardinal symptoms were present:

Master A., son of Dr. E., was suddenly seized with acute abdominal pain, vomiting, and rigidity of the right lower abdominal wall, which followed the ingestion of numerous articles of indigestible food. After a period of three days symptoms of acute peritonitis developed, at which time his father consulted me. He remarked that he would have regarded the case as one of appendicitis if the pain had not been referred to the left side. I told the father that, with all deference to him, I regarded the case as one of appendicitis demanding immediate operation. Two days later I was hastily summoned to see the son, whom I found suffering from a diffuse peritonitis of an active type, with a pulse of 130, leaky skin, constant retching and obstipation. I declined to interfere, advising the discontinuance absolutely of opium or any of its preparations, and ordered small and repeated doses of calomel to be given to the extent of free purgation, believing this a wiser course to pursue than operation. He apparently recovered from this attack. I then advised operation in order to prevent a recurrence of the trouble, but the father could not agree to have his son operated upon when he was apparently well. Within ten days a second attack occurred; I was again summoned, but being absent from the city, other counsel was sought, the operation was again deferred, and the result was an incomplete recovery from the second attack.

I was again consulted and again advised operation. The boy was brought to Philadelphia. The operation showed that the appendix, the tip of which contained a pus-collection, with an encysted abscess surrounding the same, occupied the pelvis, being adherent to the floor of the pelvis and to the right of the rectum. The appendix was removed and the recovery was uneventful.

In those cases in which the pain is referred to the left side, and the point of greatest tenderness is immediately above the pubis or in the left iliac fossa, the greatest intensity of the inflammation will be confined to the tip of the appendix. It is in this class of cases in which the appendix occupies the pelvis that bladder-symptoms, such as irritability, frequent micturition, and retention, are of value from a diagnostic point of view. The abrupt cessation of pain previously located in the region of the appendix, followed by a fall of temperature, increased pulse-rate, and an anxious expression, indicates the occurrence of gangrene of that organ.

Pathology. The primary pathological condition in an attack of appendicitis is catarrhal inflammation. The outcome

of the attack after the catarrhal condition is established depends upon several important factors: 1. Drainage of the organ. 2. The character of the micro-organisms present. 3. The presence or absence of fecal concretions or foreign bodies.

In a large percentage of cases the appendix holds a northerly position, running up behind the cæcum. This position favors, by gravity, the drainage of the organ. It also opposes the entrance of foreign matter, and in such cases the primary attack is more likely to subside. The conditions are changed, however, in an appendix which has been the seat of an inflammation. In the process of healing of the mucous membrane lining the organ strictures and twisting of the appendix due to contraction occur which interfere with drainage, and often entirely close its lumen. A condition I have met with is one of constriction with an enlargement on either side of the stricture, causing the appendix to assume an hour-glass shape. When the organ occupies any of the other positions than the northerly, drainage is interfered with by gravity. An appendix which cannot drain itself and becomes inflamed is a menace to the life of its possessor.

The character of an attack varies with the association of the bacterium communis coli with the staphylococcus or with the streptococcus, the latter combination being by far the most unfavorable. When the bowel is red and excoriated the streptococcus is present and the prognosis of the case unfavorable. I believe that the presence of a fecal concretion in appendicitis is a mere coincidence, and acts as a pathological factor only by interference with drainage, thereby making perforation more liable, and, also, by constricting the entire lumen and causing pressure and interference with the circulation, favoring gangrene of the organ to the distal side of the concretion.

Obstruction of the bowel is not uncommonly met with in the various stages of appendicitis. Ordinarily this is due to bands the result of the inflammation, or to adhesions of the tip of the appendix to adjacent bowel. I have recently met with a case which had been operated upon for the relief of a circumscribed abscess. The patient, for ten days, progressed

favorably and was considered to be beyond the danger-point. Suddenly symptoms of intestinal obstruction manifested themselves. The wound was reopened and the obstruction found to be due to pressure upon the bowel, caused by the contraction of the abscess-cavity in the processes of healing.

Follicular abscesses of the appendix are frequently met with; they are minute, often not larger than a millet-seed.

The post-peritoneal lymphatics are sometimes affected secondarily, causing large retro-peritoneal collections of pus. I have met with the pus of an appendicitis situated between the liver and the diaphragm, where it had burrowed behind the diaphragm and communicated with a bronchus, causing a purulent expectoration with an odor which indicated that gangrene of the lung was the cause of the patient's trouble,

I do not believe that leucocytosis is sound evidence of pus; I do believe that ordinary means are sufficient to enable one to make the diagnosis, and that the time spent in demonstrating the leucocytes, which prove nothing, could be better utilized in liberating the collection.

Treatment. My paper has, no doubt, impressed you with the fact that, in my opinion, operation is the only treatment for appendicitis. The best results and the smallest mortality are obtained when the operation is performed at the earliest possible opportunity. The diagnosis can and should be made in a few minutes, and the operation should follow without delay of days or even hours. If immediate operation, through doubt and delays, be impossible, then the quiescent period, that between attacks, is the next most favorable time. Operation at this period has been performed by me with a mortality of 1 per cent. in a series of two hundred cases, both deaths occurring in the first hundred. The added risks of operation for appendicitis when pus has already formed cannot be denied by anyone who is familiar with the dangers which accompany such a condition of affairs. In fact, no surgeon or physician will deny that pus complicates and materially increases the danger of any operation, and particularly when that greatest of all absorbing surfaces, the peritoneum, is involved. Picture

to yourselves the operation for the removal of an appendix before pus has formed: the clean abdominal incision; the removal of the diseased organ with the closing in by serous flaps, and invagination of the entire stump into the cæcum, with the subsequent closure of the abdominal wound, on the one hand; and, on the other hand, an abscess with its foul-smelling and infectious contents bathing the incision and contiguous parts, the unquestionably increased risk of infecting a peritoneum which nature has closed off, by the removal of an appendix which has perforated and which is probably involved in the confining wall of the lymph, the necessity of the drainage by gauze and tubes, with the increased likelihood of subsequent hernia, fecal fistula, etc. Can anyone who is familiar with these two conditions pretend to say that the former is not less dangerous and more desirable than the latter, or that the two conditions of operation do not bear out the testimony of unbiased observers? There is, of course, a small percentage of recoveries following operations for abscess-cases in which the peritoneum has been generally infected, but this depends upon the amount and character of the pus, and upon the operation being done before collapse has set in. I cannot say that I think it wise to operate upon a patient in collapse.

In operating upon pus-cases in which the appendix is involved in the wall of the abscess-cavity, I believe that it is possible and always advisable to make the operation a complete one, as in no other way is recovery assured. To leave an appendix which has sloughed off or has a perforation in it, or which has been intensely inflamed by migration of micro-organisms through its walls, with the certainty of fecal fistula or subsequent attacks, I believe to be bad surgery. It is my practice to remove the appendix in all cases. Certain it is that by the proper disposition of gauze and careful attention to technique an appendix which is deeply imbedded in a wall of lymph, whether it make a portion of the abscess-cavity wall or not, can be removed and the dangers which attend its removal are far less than those which occur when it is allowed to remain. A practice which I believe is a frequent one is

simply to evacuate the collection, there being no attempt made to remove the appendix if it be not plainly visible. This I consider, with all due deference to the surgeons who practise it, incomplete surgery. Cases of congenital absence of the appendix are reported, but are probably congenitally absent only in the mind of the searcher; I have never failed to find the appendix in chronic cases, although many times have been able to find it only after a prolonged search and a careful dissection.

I beg the privilege of a few more minutes to relate the report of a case upon which I operated November 23, 1895, and which will serve, I hope, the purpose intended, namely, to disabuse the minds of those among you who are still of the belief that a patient who has apparently recovered from an acute attack has safely passed the danger-point, and that operation is superfluous:

Boy, aged thirteen years; referred to me by my friend Dr. P. Moylan, with a history of three attacks of appendicitis. During the last attack was under the care of Dr. Moylan, who said to me that at the time of his first visit a general peritonitis was present, and was attended by so much distention that he was unable to make out by examination the cause of the peritonitis. Apparent recovery from this attack; normal temperature, etc.; operation. Incision through right semilunar line opened up a cheesy mass situated beneath the transversalis muscle. The peritoneum beneath the collection had been destroyed, and the posterior wall was formed by the great omentum. The cheesy material was curetted away and the cavity antisepticized. The great omentum was tied off around the involved portion and the latter cut away. The cæcum contained two perforations which were brought to view after the removal of the diseased and adherent omentum. The appendix laid post-cæcal, imbedded in a mass of lymph. It was perforated at its base. The pelvis contained a collection of pus which was confined by adherent coils of small bowel. Patient recovered.

In conclusion, I desire to say that an appendix that has been at any time the seat of inflammation will be a constant source of danger to the life of its possessor; that there is no medical treatment for the cure of appendicitis; and that, as Osler has so happily said, "the surgeon is frequently called too late—never too early."

DISCUSSION.

Dr. De Forest Willard: I was very glad to hear Dr. Deaver take such positive grounds with regard to appendicitis, and while many of us are not willing to go as far as he has in the matter of operative treatment, yet his experience and his results in this series of cases approve the adoption of early operative treatment. I do not think that we are all as positive as he is as to the assuredness of early diagnosis. All the cases of rapid onset are not accompanied by severe pain in the abdomen, and any of the cardinal symptoms may exist without the others. When occurring in conjunction, however, the group of symptoms make the diagnosis reasonably positive. But if he holds, as he formerly did, that simply pain in the abdomen accompanied by vomiting warrants the diagnosis of appendicitis, I do not agree with him; but when this symptom is accompanied by rigidity and local tenderness in the appendiceal region there can be little doubt of the case.

With regard to treatment, I agree with him that early operation is the best treatment. With regard to medical treatment, I do not think that severe cases which recover can be regarded as cured; they are only cases in which quiescence has occurred, and which, at any time, are liable to break out again and to require surgical operation. In mild cases, however, which recover without resultant symptoms, the second attack is so frequently wanting that we are justified in warning patients of the danger and instructing them to seek a surgeon immediately upon the ushering in of the second attack.

Dr John B. Roberts: Dr Deaver has said that the diagnosis of appendicitis is extremely easy, at least I gathered that from his remarks. I do not think that it is always easy. For instance, while in New York, a year or two ago, I saw Dr. McBurney bring a case before his class, with the statement that he proposed to operate upon the case for appendicitis On cutting down, he found not appendicitis, but a lesion of the cæcum, which was probably carcinomatous. That error in diagnosis was made by a man who is widely known for his writings on appendicitis. That incident convinced me that the diagnosis of appendicitis is not always an easy one. Some six months ago I was in the Post Graduate Hospital in New York, where I saw Dr. Morris operate before the class. He said that he was going to make a resection of the cæcum for malignant disease; but upon opening the abdomen he found that it was an ordinary case of appendicitis. Now, if mistakes can be made by men of the standing of McBurney and Morris, it seems to me that we ought not to feel uncomfortable if we should make similar mistakes. I hoped that Dr. Deaver was going to bring out in his paper some of the diagnostic points between appendicitis and other affections in the same region that are liable to be confounded with it. In the case I have just

referred to in the hands of McBurney, there was present a disease of the cæcum, which gave rise to pain and local tenderness, which caused him to call it appendicitis. The other case was one of appendicitis, which evidently did not present the ordinary symptoms, and caused Dr. Morris to regard it as a case of disease of the cæcum. I hope that what I am going to say will not be considered as personal, as this is purely a scientific discussion; but I happened, accidentally, to be in a place a short time ago where an operation was to be done upon a young woman who had pain in the right side of her abdomen, and I was told that the case had been seen by Dr. Deaver, and that he had pronounced it a case of appendicitis. The operation was done, and I saw removed what seemed to me to be a healthy appendix. I went away with the conviction that this appendix had been removed owing to mistake in diagnosis, for there were no adhesions, no perforation, no special point of congestion on its surface, and no concretion within it. To me it looked like a healthy appendix. The woman had been the subject of dysmenorrhœa; but no examination of the ovaries and tubes were made while the abdomen was open.

Dr. Thomas S. K. Morton: I congratulate Dr. Deaver upon attaining such success in technique as to have operated upon two hundred cases with only two deaths—the second hundred without mortality! I do not think that we may ever hope to see this surpassed, if, indeed, it is equalled by others in the future. With regard to diagnosis, I agree with the other speakers. Dr. Deaver has failed, it seems to me, to make the distinction clear between appendicitis and certain diseases of the liver, gall bladder, and neighboring organs. Twice I have seen the mistake made in cases which had given Dr. Deaver's cardinal symptoms: sudden onset, vomiting, and rigidity; but the lesion was in the gall-bladder. Of course, the condition called for operation just the same as appendicitis, so that it did not matter much. But to mistake a case of typhoid fever for appendicitis would be much more serious. I am in fear that some time I may open an abdomen in a typhoid fever patient in mistake for a case of appendicitis. I have always maintained that the diagnosis of appendicitis may be extremely easy or it may be exceedingly difficult—the two extremes.

I would ask Dr. Deaver what method he adopts of closing the abdominal wall, or what he regards as the best method to prevent hernia? A few days ago I was in a truss-maker's establishment, and he informed me that for months he had applied a truss to an average of five cases of incisional hernia daily. This shows that there are such cases occurring, many of whom go directly to the truss-maker, without reporting to the surgeon, who does not know of the occurrence of the hernia.

Dr. Deaver: Dr. Willard has made the remark that he is not so sure about the diagnosis. My statement was that the diagnosis of acute appendicitis is easy, and I claim that this is so. My paper was on acute and not chronic appendicitis. The three cardinal symptoms: pain in the abdomen,

rigidity of the muscles of the lower right side of the abdomen, and tenderness over the site of the appendix, with sudden onset of the symptoms, are sufficient to make the diagnosis certain. I have yet failed to see a case in which disease of the appendix was not present where these symptoms were present. Dr. Willard has referred to cases of acute indigestion. This condition yields promptly to medication, while appendicitis does not, and is not accompanied by the three cardinal symptoms. Dr. Willard also said that the cessation of the symptoms does not mean a cure; with this statement I am fully in accord. I am also in accord with Dr. Roberts in his statement that other diseases may be mistaken for appendicitis; but these have not the sudden onset of appendix cases, which, in common with the three cardinal symptoms, serves to establish the diagnosis. Indeed, it has occurred to me to find that the diagnosis is often made by the laity in these cases. Chronic appendicitis is another question. Drs. McBurney and Morris would certainly not confound acute appendicitis with malignant disease of the cæcum. In the latter case the rigidity would be absent and the local tenderness not so great, and the sudden onset of the symptoms, as in appendicitis, would be wanting. In regard to the symptoms of tenderness and rigidity, gentle palpation of the surface of the abdomen with the fingers is sufficient to reveal it in acute appendicitis.

With regard to the case referred to by Dr. Roberts of the young woman at the Polyclinic Hospital, who was operated upon and a healthy appendix found, after it had been stated that I had diagnosticated appendicitis, I can only say that I never saw but one case of appendicitis in the Polyclinic. This was in the person of the head nurse, who I was asked to see with Dr. Neilson. We advised operation without delay. Removal of a most beautifully diseased appendix.

The importance of early operation is illustrated by a case which I recently saw up town. I saw the case in consultation, and remarked to the attending physician that in my mind there was no doubt as to the presence of pus, also that I believed it was circumscribed. Further counsel sought, who questioned if the trouble was not pelvic. Advised operation through median line. The manipulation to determine the condition of the uterine appendages succeeded in liberating the collection of an appendiceal abscess. Death rapidly followed from general septic peritonitis.

With regard to Dr. Morton's remarks, I believe there are few cases, if any, of liver and gall-bladder affections in which the symptoms are so sudden in their onset as to cause any difficulty in the diagnosis. With regard to closing the abdomen, I follow the McBurney method of closing the abdominal wound in tiers, uniting each layer of tissue in succession with buried sutures. With regard to the statement of the truss-maker, I take it that those cases in which hernia occurred had not been operated upon by this method, but were those in which drainage had been used.

Dr. Morton: I did not mean to imply that all the cases of incisional

hernia had followed operations made only for appendicitis; but all kinds of abdominal operations in which section had been performed.

Dr. Deaver: The number of cases seems very large, and I can only account for it in the manner stated. In conclusion, I would refer to a recent case in illustration of the necessity of early operation. A very intimate friend, a lady apparently in vigorous health, recently left one of the large Western cities on a visit East. While East she was suddenly seized with acute indigestion, abdominal pain, and was obliged to interrupt her journey. A telegram informed her friends of these facts, when appendicitis was thought to be the trouble. The next day a letter, "No better," and two days following a telegram that "the patient had died, sleeping quietly away."

APPENDIX.

ADDITIONS TO THE MÜTTER MUSEUM.

SPECIMENS.

Microscopic Sections of a Case of Acute Encephalitis, etc. Presented by Dr. H. C. Wood.

Photograph of a Case of Pliea. Presented by Dr. H. W. Stelwagon.

Enormous Ovarian Cyst. Presented by Dr. Leon Brinkman.

Diminutive Liver, with Sections. Presented by Dr. A. A. Eshner.

Ruptured Cystoma. Presented by Dr. Joseph Price.

Myosarcoma of the Ovary. Presented by Dr. Joseph Price.

Sarcoma of the Ovary. Presented by Dr. Joseph Price.

Calcareous Fibroid of the Uterus. Presented by Dr. Joseph Price.

Three Fibroids of the Uterus. Presented by Dr. Joseph Price.

Myoma of the Uterus. Presented by Dr. Joseph Price.

Photograph of a Case of Keloid. Presented by Dr. Isaac Massey.

Extrauterine Fœtation. Presented by Dr. F. K. Brown.

Osteoma of the Pelvis. Presented by Dr. C. P. Noble.

Myoma of the Uterus. Presented by Dr. C. P. Noble.

Soft Myoma of the Uterus. Presented by Dr. J. M. Baldy.

Primary Carcinoma of the Ovary. Presented by Dr. J. M. Baldy.

Round-cell Sarcoma of the Uterus. Presented by Dr. J. M. Baldy.

Small Spindle-cell Sarcoma of the Ovary. Presented by Dr. J. M. Baldy.

Diffused Tuberculosis of the Appendages. Presented by Dr. J. M. Baldy.

Collection of Gynecological Specimens. Presented by Dr. Joseph Price.

Tumor from Beneath Quadriceps Extensor Cruris. Presented by Dr. J. B. Roberts.

Fracture and Dislocation of Hip-joint. Presented by Dr. J. B. Roberts.

Ophthalmoscopic Paintings. Presented by Dr. C. A. Oliver.

Old Anatomical Prints. Presented by Dr. C. A. Oliver.

INSTRUMENTS.

The following were presented by Dr. J. M. Da Costa:

Alison's Differential Stethoscope.
Double Stethoscope.
Original Stethoscope of Cammann.
Three Single Stethoscopes.
Stethoscope and Pleximeter combined.
Leaman's Intensifying Double Stethoscope.
Piorry's Pleximeter.
Winterich Percussion-hammer, Skoda's Model.
Percussion-hammer.
Cardiac Stethoscope.
Pond's Sphygmograph.
Moura-Bouronillon's Pharyngoscope.
Laryngoscopes.
Laryngoscopic Brush.
Laryngoscopic Knife.
Tongue-depressor for Laryngoscopy.
Nasal Compressor for Laryngoscopy.
Thudichum's original Nasal Douche.
Walton's Oxygen-inhaler.
Steam Atomizer, one of the original models.
Codman and Shurtleff's Steam Atomizer.
Two Section-cutters; double knives.
Scarificator.
Set of Muscle-beaters.
Baunscheidt's Instrument.
Clinical Thermometer, early model.
Seguin's Surface-thermometer.
Hypodermatic Syringe, early model.
Spirometer.
Three Vaginal Speculæ.

The following instruments were presented by Dr. John B. Roberts:

Galezowski's Ophthalmoscope.
Four Antiquated Ophthalmoscopes.
Four Trephines.
Sectional Trephine.
Three Cautery-irons.
Levis, Apparatus for Reducing Dislocation of Phalanges.
Malgaigne's Hooks.
Eight Vaginal Speculæ.
Pupillometer.

Old forms of Spectacles.
Laryngoscopes.
Toynbee's Ear-speculum.
Probes for Lachrymal Duct.
Forceps and Punch for Nasal Operations.
Holt's Divulsors.
Urethral Dilator.
Case of Perineum-needles.
Vaginal Insufflator.
Gooch's Cannla.
Lithotomy-scoop.
Staff.
Squire's Catheter.
Wells's Ovarian Trocar.
Atlee's Clamp.
Trocar and Canula.
Plaster Bandage-cutter.
Lister's Carbolic-spray Atomizer.
Nunnelly's Hæmostats.
Dissecting-forceps.
Percussion-hammer.

Nest of Five Horn Cups. Presented by Dr. H. A. Hare.

ABSTRACT OF THE REPORT OF THE LIBRARY COMMITTEE.

The Library now contains 49,747 bound volumes, exclusive of duplicates and of the Hodge collection. Including these, there are 55,191 ; and there are nearly 30,000 unbound pamphlets, reports, and transactions.

The Library has received during the year 617 current medical periodicals ; 98 by subscription, 109 by exchange, and 410 by donation.

There have been added to the Library 2786 books, 6098 pamphlets, and 30,854 numbers of journals ; the latter including the current journals referred to above and the purchases made by the Library for the purpose of completing its files.

Eight hundred and eighty-nine volumes have been bound.

The classification of the Lewis Library, which was still in progress at the date of the last report, has been completed, and all the books are now classified and catalogued. Nearly all the pamphlets have been classified, and some of the more important have been catalogued.

The electric light, which has recently been introduced, will add much to the convenience and comfort of Fellows engaged in research.

There have been 4514 visitors during the year. There were 1986 books taken out, and 8815 have been furnished by the Assistant Librarian for consultation in the Library.

George C. Harlan, *Chairman.*

LIST OF PAPERS: SECTION ON OPHTHALMOLOGY.

November 20, 1894.

Dr. Howard F. Hansell exhibited a Patient on whom a Successful Transplantation of Skin without Pedicle was made to the Upper Eyelid.

Dr. William F. Norris exhibited a Case of Retinitis Albuminurica in which Renal Disease was not Suspected until after Ophthalmoscopic Examination.

Dr. George E. de Schweinitz showed a Photograph of a Case of Sarcoma of the Orbit.

Dr. P. N. K. Schwenk (by invitation) read a paper upon Pediculi of the Cilia and Supercilia.

Dr. Charles Hermon Thomas presented a Case of Double Neuro-retinitis with Great Swelling of the Disk.

December 18, 1894.

Dr. Richard A. Cleemann made a brief report upon a Large Red-colored Scotoma which Appeared before One Eye and Lasted for Several Hours, the Red Area being Translucent and Uniform in Coloration.

Dr. Charles A. Oliver exhibited an Improved Form of Stereoscope intended for Exercise of the Ocular Muscles and for the Detection of Malingering.

Dr. B. Alexander Randall made some remarks Concerning Test-types, and exhibited a Sketch of the Fundus in a Case of Symmetrical White Zonular Opacity of the Macular Region in a Hydrocephalic Child.

Dr. Samuel D. Risley read the history of a Case of Infection following Cataract-extraction done under Antiseptic Precautions, and exhibited a Rotary Prism Properly Graduated, with a Total Value of only Ten Degrees.

Dr. S. Lewis Ziegler (by invitation) showed a Case of Swollen Disks with a Condition Closely Resembling Hyaline Bodies packed with Cholesterin Crystals.

January 16, 1895.

Dr. William F. Norris showed a Case of Ectopia Lentis, in which there was no family history of similar trouble.

Dr. John T. Carpenter, Jr., reported a Case of Glaucoma following Facial

Erysipelas, and made some remarks upon the Ocular Complications in the same Disease.

Dr. Charles A. Oliver exhibited a Case of Extensive Blepharoplasty for Epithelioma, and described the Procedure Employed during the Operation. He also showed the Model of an Improved Artificial Eye.

Dr. George C. Harlan showed a Patient with a New Growth, probably Sarcoma, Springing from the Choroid.

Dr. George Friebis gave a brief history of a Case of Successful Cataract-extraction in a Ninety-year-old Patient.

Dr. George E. de Schweinitz exhibited Two Water-color Sketches of Macular Coloboma.

Dr. G. Oram Ring read a paper upon Evisceration of the Eyeball with Insertion of Artificial Vitreous, and exhibited a case of the same. He showed a Case of Localized Burn of the Cornea in which an Iridectomy, followed by Extraction of the Lens, gave a vision of two-seventieths.

February 19, 1895.

Dr. George C. Harlan exhibited a Patient from whose Lens a Fragment of Steel was Removed by a Magnet.

Dr. Charles A. Oliver exhibited and explained the Details of a Successful Case of Operation for Congenital Ptosis, and showed an instance of Secondary Glaucoma with Aphakia in a Ten-year-old Boy.

Drs. George E. de Schweinitz and A. G. Thomson presented a Note upon a Second Attack of Double Optic Neuritis in a Case of Intracranial Lesion, and showed a Water-color Sketch of the Ophthalmoscopic Appearances.

Dr. Charles Shaffner showed a Case of Posterior Polar Cataract in the Left Eye and Absorbing Traumatic Cataract in the Right Eye.

Dr. Charles Hermon Thomas exhibited Some New Forms of Eyeglass-frames Illustrating a New Principle in Adaptation.

March 19, 1895.

Dr. George C. Harlan exhibited a Case of Swollen Optic Disks covered with Scintillating Crystalline Masses.

Dr. Charles A. Oliver described the Method of Operation for the Removal of a Large Epithelioma Involving both the Upper and the Lower Lids at the Outer Palpebral Commissure.

Dr. S. Lewis Ziegler (by invitation) showed Two Cases of Binocular Congenital Dislocation of the Lens Occurring in Brothers.

Dr. George C. Harlan exhibited a Case of Congenital Entropium.

Dr. Charles A. Oliver showed a Case Exhibiting the Immediate Effects of Gillet de Grandmont's Operation for Ptosis.

Dr. George E. de Schweinitz read the brief notes of a Case of Subconjunctival Dislocation of the Lens, and made some remarks upon the Field of Vision in Certain Cases of Neglected Eyes.

April 16, 1895.

Dr. George C. Harlan showed a Case of Irideremia in a Twenty-four-year-old Colored Woman in which there was the Usual Cataractous Condition of the Lenses. He exhibited a Case of Embolism of the Central Retinal Artery in which a Large Hemorrhage appeared during the Examination.

Dr. William F. Norris reported a Case of Leuco-sarcoma of the Choroid Producing Secondary Glaucoma, and made some remarks upon the Preservation of the Specimen (Leuco-sarcoma of the Choroid) in Formal.

Dr. Samuel D. Risley read the notes and exhibited a Sketch of a Case of Opacity of the Cornea Simulating Lead-deposit.

Dr. Charles A. Oliver made some remarks upon a Case of Essential Atrophy of the Conjunctiva, and showed a Water-color Sketch of the External Conditions. He gave a Blackboard Demonstration of Two Cases of Subconjunctival Dislocation of the Crystalline Lenses.

October 15, 1895.

Dr. George E. de Schweinitz described a Case showing Angioid Streaks in the Retina, and exhibited a Water-color Sketch of the Ophthalmoscopic Conditions.

Dr. Charles A. Oliver gave a brief report of the History of a Case of Successful Iridectomy and Extraction of Lens-capsule and Lens-débris, with Recovery of Vision in an Eye that had been Considered Useless for more than Ten Years. He exhibited a Case of Successful Iridectomy for Congenital Zonular Cataract in which Vision was Increased for the First Time in the Patient's Life from Finger-counting at Thirty-five Centimetres to 5/xxxv, and exhibited a Patient showing the Final Results in a Case of Subconjunctival Dislocation of the Crystalline Lens in which Vision was Restored to Full Acuity.

Dr. Samuel D. Risley exhibited a New and Compact Case for Ophthalmic Instruments.

CHARLES A. OLIVER,
Clerk of Section.

LIST OF PAPERS: SECTION ON OTOLOGY AND LARYNGOLOGY.

January 8, 1895.

Dr. B. Alexander Randall: Presentation of a case in which he had performed a Modified Stacke Operation on the Mastoid.

Continuation of Discussion of Forms of Bedside Illumination of Throat and Ear. Exhibition of Apparatus by Drs. J. Solis-Cohen, Hoch, and C. H. Burnett.

Dr. Arthur Ames Bliss: Exhibition of Scissors for Tonsillotomy, as modified by himself. Dr. J. Solis-Cohen exhibited Scissors for same purpose, as modified by himself.

Dr. B. Alexander Randall: Remarks on the Pointing or Nipple-shaped Perforation of the Membrana Tympani; Exhibition of Drawings of Same.

March 5, 1895.

Dr. Harrison Allen: Foreign Bodies in the Œsophagus.

Dr. Charles H. Burnett: Alalia of a week's duration following a Blow on the Mastoid.

April 2, 1895.

General Discussion upon the Question: "What are the Merits of Vaporization in the Local Treatment of the Ear and Respiratory Passages?"

Dr. E. B. Gleason: Anatomical Preparations of the Ear.

October 8, 1895.

Dr. Harrison Allen: Revision of the Anatomy of the Temporal Bone.

Dr. W. R. Hoch: Report of a Case of Rhinolith.

Dr. B. Alexander Randall: Pathological Specimens of Cholesteatomata of the Temporal Bone. Also exhibition of two Aural Exostoses.

Dr. E. B. Gleason: Exhibition of an Aural Exostosis and Aural Cholesteatomata.

November 5, 1895.

Dr. B. Alexander Randall: Cholesteatomata of the Middle Ear.

Dr. Charles H. Burnett: Aural Notes in a Case of Mastoiditis, with Per-

foration of the Medial Plate of the Process and Burrowing of Pus into the Post-pharyngeal Region.

December 3, 1895.

Dr. John B. Roberts: Notes of a Case of Papilloma of the Tonsil.

Dr. Blieden (by invitation): Notes of a Staeke Mastoid Operation.

Dr. B. Alexander Randall: Exhibition of a Patient on whom Staeke's Mastoid Operation had been performed; also a patient with a Nasal Synechia.

Dr. E. L. Vansant: Exhibition of a patient with Bronchocele.

Dr. E. B. Gleason: Exhibition of a patient in whom he had performed Tenotomy of the Stapedius and Severance of Incudo-stapedial Joint.

CHARLES H. BURNETT,
Clerk of Section.

LIST OF PAPERS: SECTION ON GYNECOLOGY.

The following papers have been read before the Section:

January 14, 1895.

Cœliotomy for Adherent and Displaced Omentum; Sarcoma of Ovary; Cœliotomy and Removal; with Microscopic Section of Tumor, by Dr. E. P. Davis.

Management of Labor Complicated by Valvular Disease of the Heart, by Dr. B. C. Hirst.

Ventro-fixation of the Uterus, by Dr. Charles B. Penrose.

March 21, 1895.

Ligature- and Suture-material in Hysterectomy, by Dr. J. M. Baldy.

1. Hysterectomy for Puerperal Sepsis. 2. Cases of Epithelioma of the Vulva, by Dr. B. C. Hirst.

An Operation for Restoration of the Sphincter Ani, by Dr. Robert G. LeConte.

April 18, 1895.

A Case of Myelitis following Labor, by Dr. Robert H. Hamill.

1. A Case of Cæsarean Section and Two Symphyseotomies. 2. A Large Fibroma of the Ovarian Ligament. 3. A Coincident Ovarian and Parovarian Cyst, by Dr. B. C. Hirst.

A Case of Double Tubercular Tubo-ovarian Abscess; Cœliotomy, by Dr. John B. Shober.

May 16, 1895.

Drainage in Puerperal Sepsis, with a Report of Cases, by Dr. E. P. Davis.

Dermoid Cysts and Pregnancy, by Dr. B. C. Hirst.

The Ligature in Oöphorectomy, by Dr. Charles B. Penrose.

A Case of Uterus Cordiformis; other Anomalies, by Dr. George E. Shoemaker.

October 17, 1895.

1. Large Fibroma of the Anterior Vaginal Wall. 2. The Work of Three Summer Months, by Dr. J. C. DaCosta.

A Case of Acquired Atresia of the Vagina, by Dr. Robert H. Hamill.

A Remarkable Case of Acquired Atresia of the Vagina, by Dr. B. C. Hirst.

The Vaginal Route in the Treatment of Pelvic Inflammations, by Dr. E. E. Montgomery.

Operations for Retro-displacements of the Uterus, by Dr. John B. Shober.

November 21, 1895.

A Fatal Case of Mammary Abscess, by Dr. Richard C. Norris.

A Year's Work in Ventro-fixation, by Dr. Charles B. Penrose.

A Case of Cæsarean Section in a Girl Sixteen Years of Age, by Dr. Harris A. Slocum.

December 19, 1895.

Colpocleisis, by Dr. B. C. Hirst.

Malignant Adenoma of the Uterus, by Dr. H. B. Beyea (by invitation).

JOHN B. SHOBER,
Clerk of Section.

LIST OF PAPERS: SECTION IN GENERAL SURGERY.

December, 1894.

Dr. Thomas S. K. Morton showed a patient upon whom he had performed Gastrostomy by the Method of Frank.

Dr. John B. Deaver read a paper on the Radical Treatment of Hernia.

Dr. William B. Coley, of New York, read (by invitation) a paper on the Operative Treatment of Hernia in Children, with a report of 130 cases.

January, 1895.

Dr. D. T. Lainé exhibited a Self-retaining Drainage-tube for the Treatment of Empyema.

Dr. William J. Taylor read a paper on the Treatment of Tubercular Abscesses.

March, 1895.

Dr. Thomas G. Morton showed a patient upon whom he had performed Ligation of the Common Carotid Artery for Aneurism of the Orbit, December, 1864.

Dr. Morton also showed a patient with Traumatic Aneurisms of both External Iliac Arteries.

Dr. Edward Martin reported Four Cases of Diffuse Aneurism Cured by Operation.

Dr. John B. Roberts reported a Case of Varicose Aneurism of the Thigh Treated by Transperitoneal Ligation of the External Iliac Artery, with Remarks on the Nomenclature of Vascular Lesions Characterized by Pulsation.

Dr. DeForest Willard presented a specimen of Aneurism of the Anterior Tibial Artery.

Dr. O. H. Allis presented a specimen of Aneurism of the Aorta.

Dr. W. W. Keen exhibited a Patient Cured of a Popliteal Aneurism by Ligation of the Femoral Artery.

Dr. Keen also reported a case of Venous Angioma of the Hand and a case of Venous Angioma of the Foot.

April, 1895.

Dr. A. B. Hirsh exhibited an Instrument for Feeding and Dilating in Stricture of the Œsophagus.

Dr. George Erety Shoemaker read a paper on an Improvement in the Method of Catheterizing the Ureters in the Female.

Dr. Orville Horwitz reported a Case of Traumatic Stricture of the Urethra, attended with a Stone in the Perineum weighing One and Two-thirds Ounces.

Dr. William Barton Hopkins described a Modified Extension Apparatus for the Treatment of Fractures of the Patella.

Dr. W. W. Keen reported Three Cases of Wiring the Patella for Old Fracture.

Dr. J. William White read a paper on the Treatment of Recent Fracture of the Patella by Barker's Operation, and exhibited patients so treated.

May, 1895.

Dr. Thomas S. K. Morton exhibited a Case of Iliac and Femoral Aneurism Cured by Transperitoneal Ligation of the External Iliac Artery, and a Case of Popliteal Aneurism Cured by Ligation of the Femoral Artery.

Dr. Christian Fenger, of Chicago (by invitation), made some remarks upon Conservative Surgery of the Kidney and Ureter *versus* Nephrectomy.

October, 1895.

Dr. G. G. Davis read a paper on Two Operations for Injuries of Nerves following Fractures of the Humerus and Clavicle.

Dr. Thomas S. K. Morton reported a Case of Removal of Loose Bodies from each Knee-joint; also a Case of Abdominal Section for Multiple Gunshot Wounds of the Intestines.

Dr. John B. Roberts reported a Case of Ancient Dislocation of the Hip, in which the Acetabulum was filled with a Cartilaginous Material.

Dr. Oscar H. Allis exhibited a Specimen of an Adult Pelvis showing the changes that take place in Double Congenital Dislocation of the Hip.

November, 1895.

Dr. John B. Roberts reported a Case of Small Pedunculated Myxoma of the Abdominal Cavity.

Dr. William J. Taylor reported a Case of a Dermoid Cyst in the Abdominal Wall of a Man in Direct Communication with the Umbilicus.

Dr. Oscar H. Allis reported Three Cases of Pelvic Abscess due to Appendicitis, Drained through the Rectum.

Dr. Edward Martin exhibited a Case in which Gastrostomy by Frank's Method was Performed, a Case of Excision of the Superior Maxilla, and a Case of the Radical Cure of Hernia by Halstead's Method.

Dr. John B. Roberts showed Patients exhibiting Leontiasis of the Bones of the Face and Hyperostosis of the Cranium.

ALFRED C. WOODS,
Clerk of Section.

INDEX.

Abdominal and pelvic surgery in women, 108
Allen, Harrison, 19
Appendicitis, diagnosis, pathology, and treatment of, 138
Appendix, 155
Ashhurst, John, 41, 78, 79
Atrophy, muscular, 1

Bloodvessels, development of, 81
Bones, carcinoma of, 90

Carcinoma of the bones, 90
Cephalic tetanus, 27
Children, hygiene of, 8
Cohen, Solomon Solis, 87, 89

Davis, G. G., 25, 73, 78, 79, 129, 130, 136
Deaver, John B., 138, 151, 153
Dermoid tumor of both ovaries complicated by a deposit of bone upon each side of the true pelvis, having no connection with the tumors, 100
DeSchweinitz, Dr., 55
Dixon, Dr., 17
Duhring, L. A., 25
Dulles, Charles W., 17, 84, 89
Dunn, Thomas D., 45

Eczema of mucous membranes, 20
Eshner, A. A., 107

Gastric secretory function, absence of, 62
Geographical centre, loss of, 45
Griffith, J. P. Crozer, 8, 17
Gynecology, report of section on, 164

Hare, H. A., 16, 26
Harlan, Dr., 43
Harris, R. P., 61, 70, 71
Harte, Richard H., 155

Hartzell, M. B., 20, 26
Hemianopsia, double, 45
Hemifacial paralysis, 27
Hemiplegia, double, 45
Henry, F. P., 79
Hernia, radical cure of, 130
Hinsdale, Guy, 18
Hydrophobia, remarks on, 85
Hygiene of children, 8
Hypospadias, case of, with hermaphroditic appearance, 18

Johnston, James I., 27

Larynx, acute œdema of, 57
Leidy, Joseph, 55
Library Committee, report of, 158
Lloyd, James Hendrie, 7, 40

McFarland, Joseph, 43
Massey, Isaac, 69
Meigs, Arthur V., 15, 16, 41, 81
Montgomery, E. E., 127
Morton, Thomas S. K., 151, 152
Mucous membranes, eczema of, 20
Muscular atrophy and peripheral nerve-changes following typhoid fever, 1
Musser, J. H., 90
Mütter Museum, additions to, 155

Noble, Charles P., 100, 107, 108, 136

Œdema of the larynx, acute, 57
Ophthalmology, report of section on, 159
Otology and laryngology, report of section on, 162
Ovariectomy in Shanghai, 71
Ovaries, dermoid tumor of, 100

Pneumotherapy, presentation of a new instrument for, 87

Radical cure of hernia, 130
Rheumatoid arthritis, 73
Roberts, John B., 150
Ruptured uterus, 69

Shoemaker, George Erety, 129
Sinkler, Wharton, 41, 56
Stewart, D. D., 62
Surgery, report of section in general, 166

Tendon of biceps, rupture of, 73
Tetanus, cephalic, 27
Tunis, Joseph P., 100
Typhoid fever, 1

Uterus, a case of ruptured, 69

Wharton, H. R., 57
Willard, DeForest, 27, 43, 150
Wood, Horatio C., 16

INFANTILE MORTALITY DURING CHILD-BIRTH AND ITS PREVENTION.

BY

A. BROTHERS, B.S., M.D.,

Visiting Gynecologist to Beth Israel Hospital, New York; Attending Gynecologist to the New York Clinic for Diseases of Women; Instructor in Operative Gynecology at the New York Post-Graduate Medical School and Hospital; Fellow of the Academy of Medicine, Etc.

William Furness Jenks Prize Essay of the College of Physicians of Philadelphia.

PHILADELPHIA:
P. BLAKISTON, SON & CO.,
1012 WALNUT STREET.
1896.

Copyright, 1896, by

James V. Ingham, M.D., Charles S. Wurts, M.D., I. Minis Hayes, M.D. and Horace Y. Evans, M.D.

Trustees of the William Furness Jenks Prize Fund.

Press of
The Jas. B. Rodgers Printing Company,
52 and 54 North Sixth Street,
Philadelphia.

INFANTILE MORTALITY DURING CHILD-BIRTH AND ITS PREVENTION.

TO

The Memory of

WILLIAM FURNESS JENKS, M.D.,

WHOSE EARLY DEATH ALONE PREVENTED HIS OCCUPYING A FOREMOST

PLACE AMONG

OBSTETRICAL WRITERS,

THIS ESSAY,

HONORED BY THE SECOND AWARD OF THE

WILLIAM FURNESS JENKS MEMORIAL PRIZE,

IS PUBLISHED BY THE

TRUSTEES OF THE MEMORIAL FUND.

To the Trustees of the William Furness Jenks Memorial Prize Fund.

Gentlemen:—

The William Furness Jenks Prize Committee of the College of Physicians beg leave to report that the subject selected for the prize of five hundred dollars was "Infant Mortality during Labor, and its Prevention."

Six essays were received, and after critically examining them, the Committee decided that the one with the motto "Vive L'Enfant" was the best Essay presented, and, consequently, its author, A. Brothers, M.D., of New York City, is entitled to the Prize.

Respectfully submitted.

HORACE Y. EVANS.
EDWARD L. DUER.
EDWARD P. DAVIS.

PREFACE.

The art of obstetrics has been brought to such a high scientific standard by careful and learned men of the past that it requires a certain amount of courage to intrude on this oft-trodden road without feeling that we can add something to the knowledge already possessed. Our fathers and forefathers, in this particular field of work, have been such careful and astute observers that rules laid down years ago for the management of the manifold accidents and complications occurring during child-birth are, in the main, still adhered to to-day. To be sure we have made some differences and advances in methods of treatment, especially since the sister branch of obstetrics —gynecology—was developed into its present enormous proportions. But the use of the forceps, the various modes of treating prolapsus of the cord, and the methods of changing the presenting parts, in the interests of mother or child, are not new, but have been handed down to us. It must, however, be conceded that we of the present generation have not been idle. All sorts of changes and improvements in the technique of obstetrical manœuvres, with ever-constant efforts to improve the instruments at our command, are continuously being made all over the civilized world. There is one phase of this subject in which we are distinctly in advance of our forefathers. With the limited means at their command, with the dangers of shock and septicemia to the mother constantly glaring them in the face, it was natural for them to do everything for the mother and little or nothing for the child. This superstition of the past, in which the sacrifice of the child counts for little or nothing, still has strong hold

on the community, and, probably, will continue to hold more or less sway until the art of obstetrics, combined with gynecology, shall reach such a degree of perfection that the major operations of to-day—from which the mass of practitioners involuntarily shrink—can be performed with slight or little maternal risk. If such a time ever does arrive, and there seems to be good reason to hope that it may, the sacrifice of living children by operations like craniotomy, evisceration, etc., will be buried in the gloomy depths of the past, and many a useful member of society, now doomed to death before having had an opportunity to draw a single breath, will be added to the community at large.

Since the recent results of the Cesarian section, and of the revived symphyseotomy, have assumed so favorable an aspect, we are on the threshold of a new era in the development of the obstetric art. The object of the present essay is to make a careful bird's-eye view of the entire subject without attempting to give a detailed account of everything, as required in text-books, and to point out the advances made in recent years in the interests of the unborn child previous to labor, during the critical hours of actual labor, and in the earliest period of life succeeding labor. The writer assumes this highly responsible task on the basis of a ten-years' active midwifery practice, combined with a large experience in the fields of pediatrics and every-day gynecology. As a result of this tripod foundation, he feels that his points of observation have been sufficiently comprehensive to allow him to carefully weigh the subject in both hands.

TABLE OF CONTENTS.

Chapter		Page
	Preface	3
I.	General Remarks	11
	The Accoucheur	11
II.	Statistics of Infantile Mortality	14
III.	Morbid Anatomy and Etiology	16
	Studies of forty-seven post-mortem examinations	16
IV.	Causes of Infantile Mortality	21
V.	Infantile Mortality due to Maternal Causes	24
	a. Preceding Labor	24
	1. Maternal Death before the Onset of Labor	25
	2. Constitutional Diseases of the Mother	26
	Syphilis	27
	Tuberculosis	28
	Malaria	28
	3. Organic Diseases of Heart or Kidney	29
	Cardiac diseases	29
	Nephritis, Albuminuria, Eclampsia	30
VI.	Maternal Causes Preceding Labor (Continued)	33
	4. Acute Diseases	33
	Typhoid, Typhus or Relapsing Fevers	33
	Pneumonia	33
	Cholera	33
	Septicemia	34
	Contagious Diseases—Scarlatina, Measles, Erysipelas	34
	5. Chronic Disorders of the Chest	35
	Emphysema, Pleurisy, Bronchitis and Empyema	35
	6. Diabetes, Icterus and Chorea	35
	Lead and Tobacco Poisoning	36
	7. Hyperemesis and Maternal Shocks and Injuries	36
	8. Extra-uterine Pregnancy	37
	9. Uterine Abnormalities	37
	Diseases of the Decidua	38
	Hydramnion	38
	Putrefaction of Amniotic Fluid	39
	10. Placental Abnormalities	40
	Placental lesions	40
	Placental previa	40

Chapter		Page
VII.	Infantile Mortality due to Maternal Causes (Cont'd)	41
	b. During Labor	41
	1. Anomalies in Uterine Contractions	41
	Precipitate labor	41
	Protracted labor	42
	Ante partum hour-glass contraction	45
VIII.	Maternal Causes During Labor (Continued)	46
	2. Dystocia due to the Soft Parts	46
	Persistence of the Hymen	46
	Swelling and Œdema of the Vulva	46
	Thrombi and Hematomata of the Vulva and Vagina	46
	Atresia of the Vulva	46
	Prolapsus of the Vagina	46
	Retention of the Urine or Vesical Calculi	46
	Fecal Impaction	46
	Vaginal Hernia and Atresia	46
	Vaginismus and Vaginal Neoplasms	47
	Thrombi and Cicatrices of the Cervix	48
	Hypertrophic Elongation of the Cervix	48
	Occlusion of the Os Externum	48
IX.	Maternal Causes During Labor (Continued)	50
	Growths of the Cervix	50
	Carcinoma of the Cervix	50
	Displacements of the Uterus	51
	Abnormal Uterine Development	51
X.	Maternal Causes During Labor (Continued)	53
	Placenta Previa	53
XI.	Maternal Causes During Labor (Continued)	56
	Fibroid Tumors of the Uterus	56
XII.	Maternal Causes During Labor (Continued)	59
	Ovarian Tumors	59
XIII.	Maternal Causes During Labor (Continued)	61
	3. Dystocia due to the Bony Parts	61
	Pelvic Tumors	61
	Deformities of the Pelvis	61
XIV.	Maternal Causes During Labor (Continued)	66
	Treatment in Contracted Pelvis	66
	Premature Induction of Labor	66
XV.	Maternal Causes During Labor (Continued)	70
	Forceps	70
XVI.	Maternal Causes During Labor (Continued)	73
	Version	73
XVII.	Maternal Causes During Labor (Continued)	77
	Symphyseotomy	77

CHAPTER		PAGE
XVIII.	MATERNAL CAUSES DURING LABOR (CONTINUED)	81
	Cesarian Section	81
	Craniotomy	86
XIX.	MATERNAL CAUSES DURING LABOR (CONTINUED)	87
	4. Rupture of the Uterus	87
XX.	INFANTILE MORTALITY DUE TO FETAL CAUSES	88
	a. Preceding Labor	88
	1. Diseases of the Fetus in Utero	88
	Peritonitis	88
	Fevers, Icterus, Skin and Cellular Tissue Lesions	89
	Scrofula and Bone Affections and Cerebral Lesions	89
	Diseases of the Respiratory Organs	89
	Diseases of the Circulatory Organs	90
	Digestive Tract, Liver and Spleen	90
	Congenital Syphilis	90
	Intra-uterine Rachitis	91
XXI.	FETAL CAUSES PRECEDING LABOR (CONTINUED)	93
	2. Multiple Pregnancy	93
	3. Intra-uterine Accidents	94
	Torsion of the Umbilical Cord	94
	Rupture, Knots, and Coilings of the Cord	94
	Stenosis of Umbilical Vessels	95
	Ante partum Hemorrhage	95
XXII.	INFANTILE MORTALITY DUE TO FETAL CAUSES	97
	b. During labor	97
	1. Malpositions or Malpresentations of the Fetus	97
	Vertex Presentations	97
XXIII.	FETAL CAUSES DURING LABOR (CONTINUED)	100
	Brow Presentations	100
	Face Presentations	101
	Inclined Positions of the Vertex	104
XXIV.	FETAL CAUSES DURING LABOR (CONTINUED)	106
	Breech Presentations	106
XXV.	FETAL CAUSES DURING LABOR (CONTINUED)	111
	Transverse Presentations	111
XXVI.	FETAL CAUSES DURING LABOR (CONTINUED)	114
	2. Prolapse of Umbilical Cord	114
	3. Errors in Length of the Umbilical Cord	118
XXVII.	FETAL CAUSES DURING LABOR (CONTINUED)	120
	4. Multiple Pregnancy	120
	5. Prolapse of Various Parts at One Time	122
	6. Excessive Development of the Fetus	124
XXVIII.	FETAL CAUSES DURING LABOR (CONTINUED)	126
	7. Diseased States of the Child's Head	126
	8. Diseased State of the Child's Neck and Body	127
	9. Constitutional Debility of the Fetus	129

Chapter		Page
XXIX.	Infantile Mortality due to Fetal Causes	130
	c. Directly Following Labor	130
	Physiology of the New-born Child	130
XXX.	Fetal Causes Following Labor (Continued)	134
	Asphyxia Neonatorum	134
XXXI.	Fetal Causes Following Labor (Continued)	139
	Symptoms of Asphyxia Neonatorum	139
XXXII.	Fetal Causes Following Labor (Continued)	143
	Treatment of Asphyxia Neonatorum	143
XXXIII.	Fetal Causes Following Labor (Continued)	152
	Prematurity	152
	Cerebral Hemorrhage	152
	Injuries to the Head and Face	153
	Injuries to Other Parts	154
	Congenital Diseases	155
XXXIV.	Fetal Causes Following Labor (Continued)	157
	Umbilical Hemorrhage	157
	Gastro Intestinal Hemorrhage	158
XXXV.	Fetal Causes Following Labor (Continued)	161
	Trismus Neonatorum	161
XXXVI.	Fetal Causes Following Labor (Continued)	164
	Sepsis in the Newly-Born	164
	1. From the Navel-Wound	164
	2. From Sources other than the Navel	166
XXXVII.	Fetal Causes Following Labor (Continued)	169
	Erysipelas of the Newly-Born	169
	Icterus of the Newly-Born	170
	Acute Fatty Degeneration of the Newly-Born (Buhl's Disease)	171
	Epidemic Hemoglobinuria (Winckel's Disease)	172
XXXVIII.	Prevention of Infantile Mortality	174
	General Considerations	174

TO HIS HONORED FRIEND AND TEACHER

ABRAHAM JACOBI, M.D.,

THIS WORK

IS DEDICATED AS A SLIGHT TOKEN OF APPRECIATION

BY THE AUTHOR,

FOR THE MANY ACTS OF KINDNESS SHOWN HIM

FROM THE

EARLIEST PERIOD OF HIS PROFESSIONAL CAREER.

INFANTILE MORTALITY

DURING

CHILD-BIRTH, AND ITS PREVENTION.

CHAPTER I.

GENERAL REMARKS.

The Accoucheur.—The attendance during labor to-day, as in the past, falls chiefly into the hands of two classes of people—the midwife and the general practitioner. This we believe to be right, but open to improvement. It is worth while to again draw attention to this important subject, for, in every labor, two human lives are at risk. Does it not seem paradoxical and contradictory that in just this branch of medicine the greatest amount of carelessness and ignorance prevails? Who are the midwives in this country? They can be divided into three classes: 1. The old woman or neighbor who knows nothing at all, but assumes charge of the accouchement. This is of course criminal, but the offence is continuously perpetrated in a large city all the same and rarely prosecuted. 2. The midwife with a foreign diploma, who knows or pretends to know everything. These women are mischievous from the fact that, presuming to know everything, their high sense of inflated dignity prevents them from calling in medical assistance in the interests of mother or child until it is too late. 3. The third variety embraces our home product.

Who are they? Graduated from private schools founded by physicians, with strong business instincts, but little professional standing, these women, after short courses of doubtful instruction, are thrown upon a gullible and little suspecting public to ply their calling, and we, the medical profession, stand calmly by and see human lives sacrificed by the score without almost a single protest! If this condition of affairs could be improved, the greatest possible stride in advance toward preventing infantile mortality during child-birth would be accomplished at one single bound. As a recent writer says: "More lives of unfortunate women would be saved than any threatened infectious disease can destroy; hundreds of children would be among the living which now, through ignorance, pass as still-born" (Francis Foerster, Post Graduate, May, 1895). How can this state of affairs be improved? By following the example of European nations and establishing authorized colleges, and after that holding the graduates criminally responsible for their work. Such a state of affairs can readily be brought about by concerted action emanating from the various academies of medicine and medical societies. A proper recommendation from such bodies seriously pushed would be sufficient to get the State sufficiently interested in the matter to provide the requisite legislation.

In the profession itself the largest amount of obstetric work falls into the hands of the general practitioner. And this is only right, for the day of the pure obstetric specialist is as far in the future as it can only be. But is there no room for improvement here? The writer has met practitioners who have told him that the hours of attendance on their first cases were spent in anguish. Many of them had never attended a case of labor previous to entering upon practice. Such an attending physician is really worse than an ignorant midwife. Fortunately our colleges are taking this thing in hand and the graduated physician of to-day is, on the average, a much better prepared man than his colleague was ten years ago.

The obstetrician of the future must be thoroughly educated and trained in the branches of obstetrics, gynecology and pediatrics.

To be thoroughly versed in obstetrics without a good knowledge of gynecology will not fit a man properly for the more recent operative work taught us by this latter science in the interests of the mother and child entrusted in his charge. Similarly, but to a less degree,

is a knowledge of the branch of pediatrics—so very much neglected in medical colleges—necessary to the obstetric physician. A careful watch of the condition of the child during every labor is an essential in modern obstetrics. An approximate estimate of the size of the child, a study of its heart-sounds from time to time during the progress of labor, a consideration of possible inherited or congenital diseases, a knowledge of the thinned structure of its blood-vessels and other tissues or organs, the nature, size, and position of its cranial sutures and fontanelles—are a few of the dozens of facts, cognizant to every student of pediatrics and of great value in determining the nature of interference looking towards its safety. After labor this branch of medicine assumes great importance if we wish to save as many as possible of our newly-born, which now, often, are sacrificed by the universal neglect which this little being receives on emerging into the world. After being delivered, the majority of physicians toss the newly-born to a nurse, as though it were a mere bagatelle, and devote themselves to the mother exclusively. How many of such children are sacrificed yearly to pneumonia from a cold bath, to gastro-enteritis from improper nourishment, to sepsis from an improperly protected navel?

Besides being properly educated, the obstetrician of the "first water" must be a man of sound judgment, conservative as a rule, but capable of showing intense coolness and courage under emergencies. He must be a man of patience, but one who will not sacrifice infantile life by delay. He must be willing to leave the majority of cases to nature, but must not shrink, in case of necessity, from the thoughts of version, forceps, symphyseotomy, or Cesarian section. And, although it would be manifestly exaggerated to expect every general practitioner to be prepared to perform all these operations himself, he must be sufficiently well informed to know the indications for these various methods of interference and be sufficiently at home in gynecological work to be a useful assistant instead of an obstruction.

CHAPTER II.

STATISTICS OF INFANTILE MORTALITY.

Through the courtesy of Dr. John T. Nagle, of the Bureau of Vital Statistics of New York City, I am enabled to present the following table of infantile mortality occurring in this city during the years 1889 to 1892:

Year.	Total No. of Births.	Total No. of Still Births.	Still Births at Full Term.	No. of Deaths at Less Than Four Weeks.
1889	37525	3349	1533	2668
1890	39250	3315	1477	2560
1891	46904	3414	1514	2783
1892	49447	3573	1539	2814
	173,126	13,651	6,063	10,825

During four years, therefore, with 173,226 births there were 13,651 still-births at all stages of utero-gestation reported, and 6063 at full term. As cases of abortion occurring during the early months are seldom reported, these figures can safely be assumed to refer to children who have reached the viable stage of fetal existence. But, taking into consideration only those cases which have gone on to the full term, we still find the amazing ratio of one dead-born child to every 28.5 deliveries, or a mortality of nearly four per cent. This, however, does not include those children which have breathed, but have not survived the first hours, days or weeks of life. To determine the number of children which do not pass the first four weeks of life the last column of figures gives us light. While we do not claim that these deaths can be attributed to causes arising during labor, but may, in great measure, be traced to post-natal etiological factors, still the close relationship which they bear to the subject under consideration renders them worthy of some notice. Thus, if these cases be added to the still-births at term, we find that, during this period of four years, 16,888 children born at term have died within the age of one month.

This represents a proportion of one death to every 10.8 labors. That ten per cent. of our children should be lost before they have reached the age of one month is perhaps a startling fact to many, but those who have made a study of infantile mortality will readily accede to the truth of these figures. During the past year studies in this direction, but on a much larger scale, have been carried on by Julius Eröss on the Continent (Jahrb. f. Kinder heilkunde, 1893, xxxv. p. 9). Studying the statistics of sixteen large European cities and including no less than 1,439,056 children, he finds that ten per cent. of the children born alive die within the first four weeks of life. These results were arrived at about the same time the writer was making his investigations, so that, although working independently of each other, we have both reached almost the same conclusions. Eröss, furthermore, discovered that the largest mortality occurred on the first day of life and diminished day by day as the child grew older. Of all the children which died within four weeks after birth he attributes 54.24 per cent. of the deaths to one cause—congenital debility. As the records of our Bureau of Vital Statistics are not reliable in regard to this matter, the writer has not been able to study numerically into this etiological factor, but believes the deductions of Eröss to be fairly correct.

CHAPTER III.

MORBID ANATOMY AND ETIOLOGY.

STUDIES OF FORTY-SEVEN POST-MORTEM EXAMINATIONS.

In order to make this chapter contain as much original work as possible, the author intended to collect the records of a large number of autopsies made on newly-born children, and draw his deductions from this source instead of rehashing the material already existing in the numerous text-books on this subject. To his intense regret he found, after communicating with three large institutions devoted to the care of newly-born children, that in one of them no autopsies at all were held on these cases, and that in the other two, during the past ten years, only forty-seven post-mortems had been made. It is needless to add that this is a shameful state of affairs. One gentleman, well known as a pathologist, whose autopsies number by the hundreds, frankly wrote me that he had never made an autopsy on a still-born child. With the above explanatory apology, and in the hope that it may draw attention to this very much neglected field, the writer proceeds to append the adjoining table and, as far as possible, summarize it:

We have sub-divided the cases into three sets: (1) Still-born children; (2) Those which died within twenty-four hours; (3) Those which died within fifteen days.

In the six cases of still-birth the lungs were found atelectatic and non-ærated; extensive hemorrhages in the alveoli and intra-alveolar tissue were present in one. In the heart were found patent foramen ovale, clots in the right and left ventricles, and, in one case, the lesions of ulcerative endocarditis. The liver and kidneys of one of the children showed diffuse small-celled infiltration, with thickening of the arterial walls. In one child, after difficult instrumental delivery, was found a fracture of the left parietal bone with extravasation of blood under the scalp and congestion of the brain substance. In one difficult labor case the sutures of the skull were found after death

No. of Case.	Age.	No. of Children.	Presentation.	Labor.	Pelvis.	Child.	Cord.	Lived.	Cause of Death.	General Facts and Conditions Found at Autopsy.
1	24	Primipara	R. O. A.	Tedious		Asphyxiated		2 days.	Probably unærated lungs	Nothing unusual found at autopsy.
2	23	Primipara?	Breech	Normal		Normal		1 day	Catarrhal pneumonia of both lungs	
3	45	II-para	L. O. A.	Precipitate		Asphyxiated		9 days	Congenital debility	Lungs only partially ærated. Cleft palate.
4	17	Primipara	Vertex			Still born		....	Ulcerative endocarditis	
5	22	Primipara	L. O. A.	Tedious; forceps				.....	Probably unærated lungs	Nothing unusual found.
6	21	Primipara	R. O. A.	Normal				8 days	Anæmia (?)	Lungs slightly ærated; liver deeply bile-stained; other organs anæmic; ecchymoses in the skin.
7	19	Primipara	R. O. P.	Tedious; forceps		Asphyxiated		6 days	Asphyxia and cerebral hemorrhage	Hemorrhages at base of brain; also in the middle and posterior fossæ of cranium; and in the cerebellum.
8	26	Primipara	L. O. A	Tedious				2 hours	Pulmonary atelectasis	Maternal fall with uterine hemorrhage. Patent foramen ovale.
9	21	Primipara	R. O. A.					15 days.	Marasmus	Œdema of the glottis. Lungs congested.
10	21	Primipara	R. O. A.				Coiled about neck	2 days.	Intussusception	Slight hemorrhage in pericardial sac.
11	22	Primipara	L. O. A.					3 days.	Medullary hemorrhage; jaundice	Hypostatic congestion of left lung; liver enlarged and yellowish-brown; spleen enlarged; adhesions about descending colon and inflated.
12						Convulsions and jaundice		2 days.	Pneumonia; cerebral hemorrhage and meningitis	Catarrhal pneumonia; purulent meningitis; increase in liquid contents of lateral ventricles.
13	27	Primipara	L. O. R.			Asphyxiated		14 days.	Septicæmia	Abscess of right mammary gland; hyperæmia of liver.
14	20	Primipara	L. O. A.	Tedious; forceps		Cyanotic		10 days.	Congenital cardiac disease	
15		VII-para						4 days.	Imperforate anus	Death after operation.
16	24	Primipara	Vertex			Persistent vomiting		2 days.	Peritonitis, nephritis, pneumonia	Matting of liver, intestine and gall-bladder; cirrhotic liver; interstitial and parenchymatous nephritis; interstitial pneumonia.
17	35	Primipara	Vertex			Still-born		....	Congenital atelectasis	Antemortem clot in right and left auricles; lungs unærated.
18	22	Primipara	Brow?	Tedious; forceps		Still-born	Coiled about neck	.....	Fracture of skull; hemorrhages in lungs	Rigor mortis; fracture of left parietal bone; bloody extravasation beneath scalp; lungs unærated; brain congested; kidneys were the seat of diffuse small-celled infiltration with thickening of arterial walls, the same in liver, but to a less extent; extensive hemorrhages in the alveoli and intra-alveolar tissue of the lungs; also infiltration with leucocytes.
19	35	III-para	Vertex	Tedious; forceps	Contracted	Large; still-born		.....	Congenital asphyxia	Hematoma of scalp; congestion of brain; rigor mortis; lungs unærated.
20	22	Primipara	Vertex	Tedious; version; forceps	Contracted	Large	Prolapsus	1 day.	Cerebral hemorrhage	Rigor mortis; septum imperfectly closed; hematoma of scalp; hemorrhages surrounding right kidney; extensive hemorrhage at base of brain; congestion of membranes of brain.
21	30	Primipara	Vertex	Tedious; forceps	Contracted	Large		5 days.	Rupture of right kidney	Difficulty in extracting body of child; much serum and fibrin in peritoneal cavity.
22	19	Primipara	Vertex	Tedious	Contracted	Large; still-born		.....	Cerebral hemorrhage; congenital asphyxia	Scalp wound; premature ossification of skull; brain clots; thickening and opacity of pia mater; lungs non-ærated.
23	18	Primipara	Vertex	Tedious		Large; still-born		...	An encephalous monster	Cleft palate; entire absence of cerebrum and cerebellum.
24	31	Primipara	Vertex	Tedious; rigid os		Large		Few hrs.	Congenital asphyxia or debility	Congestion of kidneys and liver; also of stomach and portions of small intestine; stomach distended with gas and mucus; ecchymoses in ileum and jejunum.
25	31	IV-para	Vertex	Tedious; forceps and version		Large; asphyxiated; convulsions	Non-pulsating	7 hours	Congenital atelectasis	Posterior fontanelle absent; cerebral sinuses filled with dark blood; brain congested, œdematous, and soft; heart filled with dark clots; bloody extravasations in heart-substance; mucus in trachea.
26	16	Primipara	Vertex					4 days.	Imperforate rectum	Hypospadia; jaundice; secondary hemorrhages; intestinal distension.
27	28	III-para	Vertex			Jaundiced		5 days	Heart failure	Found dead in bed; lungs the seat of atelectasis, congestion, and ecchymoses; liver hyperæmic and ecchymotic with beginning fatty degeneration; blood dark.
28	19	I-para	Vertex			Asphyxiated		5 days.	Congenital atalectasis	Cerebral sinuses filled with semi-fluid blood; portions of brain congested; ecchymosis and staining of occipital bone; greater portion of lungs non-crespitant; liver enlarged and congested; also duodenum; gall-bladder distended by obstructing mucus in duct; bloody liquid in uterine cavity.
29	26	I-para	Vertex			Premature (8-months)		2 days.	Prematurity; congenital atelectasis	Abnormal amount of gas; stomach congested with grumous blood in its cavity; liver and spleen enlarged; kidneys show urate infarcts; heart substance pale; lungs collapsed and pale with a few ecchymotic patches.
30	31	I-para	Vertex			Large		2 days	Hydrocephalus	Blood oozing from nose and mouth; thinning of brain-substance with over-distension of the lateral ventricles; liver, kidneys and spleen congested; lungs ærated; stomach dark; intestines pale and distended with gas.
31						Cyanotic		19 hours	Central hemorrhage; pulmonary atelectasis	Heart normal, but filled with blood; thymus large; subpleural ecchymoses; atelectasis; firm, organized clot at base of cerebellum.
32	17	I-para	Vertex	Tedious		Large	Gangrene	3 days.	Sepsis from navel	Bloody extravasation about navel with gangrene; ecchymotic spots over surface of body; subaponeurotic and subdural clots; surface of brain covered by clot; brain soft; lateral ventricles filled with bloody serum; hemorrhagic effusion in pleural cavity; lungs congested; stomach contains mucus and altered blood; extravasations in intestine.
33	20	I-para	Vertex	Tedious		Large; convulsions		42 hours	Intra-meningeal hemorrhage	Hypostatic congestion of lungs.
34	21	I-para	Vertex	Normal		6-pounds		½ hour.	Congenital syphilis; pulmonary atelectasis	Pemphigus; brain soft; blood-stained cerebro-spinal fluid; puncta vasculosa; lungs slightly ærated; spleen large, dark, and firm; liver resistant and grizzly.
35	24	I-para	Vertex	Normal		5¾-pounds		35 hours	Meningeal hemorrhage	Brain soft; blood in meninges; also blood (semi-fluid) about medulla and cerebellum; lungs ærated; liver congested; urate infarcts in kidneys.
36	22	I-para	Vertex	Normal		Premature (7-months)		55 hours	Prematurity	Heart pale and small; foramen ovale, partially open; aorta curved to the right; thrombi in hypogastric arteries; kidneys showed infarctions; liver large; stomach small.
37	22	I-para	Vertex	Normal		Fairly large		28 hours	Meningeal hemorrhage; pulmonary atelectasis	Ecchymotic spots over skin and lungs and heart; lungs atelectatic; heart pale; liver slightly pale; brain soft and filled with liquid blood; also large clot.
38	20	I-para	Vertex	Normal		9¼-pounds		30 hours	Cerebral hemorrhage; pulmonary atelectasis	Cerebellar and meningeal hemorrhage; pulmonary atelectasis and œdema; mucus and serum in trachea and bronchi; clots in heart; urate infarcts.
39	30	I-para	Vertex	Normal			Phlegmon	5 days.	Umbilical abscess; erysipelas (general); diffuse peritonitis	Mother died of erysipelas.
40	18	I-para	Vertex	Normal		Skin eruption		5 days.	Erysipelas of inguinal region; diffuse peritonitis	Cerebro-spinal fluid blood-stained.
41								2 days.	Meningeal hemorrhage; pulmonary atelectasis	After 12 hours child became cyanotic.
42	27	I-para		Precipitate		Premature (7-mos.); one of twins weight 3¼-pounds		14 hours	Prematurity; cerebral hemorrhage; pulmonary atelectasis	Ventricular hemorrhage; tracheitis; small ecchymoses in serous membranes; pulmonary œdema.
43						Mate to last; weight 3-pounds		13 hours	Prematurity; pulmonary œdema	Small ecchymoses in the serous membranes.
44			Vertex	Normal			Purulent	10 days	Umbilical phlebitis; pyæmia	150 c. m. turbid serum in peritoneal cavity; purulent inflammation of umbilical vein and branches of the portal vein; small abscesses in liver; enlarged lymphatics; peri-splenitis.
45	25	I-para	Vertex	Normal		Premature (8-mos.); one of twins		4 days.	Prematurity; cerebral hemorrhage; catarrhal inflammation of air-passages	Tracheitis, bronchitis, broncho-pneumonia, circumscribed pleuritis; catarrhal gastritis; intra-ventricular and meningeal hemorrhage; urate infarctions.
46	29	I-para	Vertex	Normal		Persistent vomiting		6 days.	Intestinal obstruction	Duodenum passed through an aperture in the head of the pancreas and was greatly distended above; right kidney displaced in the pelvis; internal hydrocephalus; greenish material from stomach in larynx, trachea, and bronchi.
47	23	I-para	Vertex	Normal				10 days.	Purulent parotiditis; pyæmia	Pemphigus eruption on skin; hemorrhagic nodules and beginning abscesses in both lungs; some pleurisy; suppuration and sloughing of both parotids.

completely ossified, and, in a forceps case, there was a scalp wound with hemorrhage beneath. Clots in the brain were present at times, and one brain showed thickening and opacity of the pia mater. In the case of an encephalous monster, as was to be expected, there was a complete absence of the cerebrum and cerebellum. In single instances exophthalmus and cleft palate were found.

In eight cases the children were born alive, but died within twenty-four hours. *In five of these there was distinct atelectasis.* Two cases showed subpleural ecchymoses, and one each presented the lesions of pulmonary œdema and catarrhal pneumonia. The heart showed partial or complete patency of the foramen ovale in two cases; contained dark, imperfectly clotted blood in two others, and, in still another case, showed bloody extravasation in the heart substance. The liver in some of the cases was congested, in others resistant or grizzly to the touch. One spleen was found to be dark, large, and firm. In one case the kidneys were congested, and hemorrhage was found surrounding a kidney in another. The stomach was congested or distended with gas and mucus. In one case the duodenum, jejunum, and ileum were markedly congested with patches of ecchymosis. Intracranial hemorrhages were present in various localities: the cerebrum, cerebellum, and ventricles. Some cases showed congestion of the brain substance and membranes, others showed narrowing or absence of fontanelles and sutures. In some the cerebral sinuses were full of dark blood, or the brain substance was congested, œdematous, and soft. One brain showed numerous punctata vasculosa, and the cerebro-spinal fluid of another was blood-stained. The peritoneum was the seat of ecchymoses in one. The skin was noted as markedly cyanotic in some, while in others were found hematomata or the eruption of pemphigus. The lesions of tracheitis were observed in one, and an enlarged thymus was noted in another.

In twenty-eight cases death occurred between one and fifteen days after birth. Even in these the lungs are distinctly stated as being the *seat of more or less atelectasis in eight*, with congestion and ecchymoses in four or five others. Particular attention is called to this matter of atelectasis and non-æration of the lung tissue to prove the statement, which we shall make in a later chapter, that it may require many days of life in feeble children before the lungs can be considered as fully ærated. Such children left to nature, after being born

asphyxiated, often die, whereas, if persistent and repeated efforts be made to get the lungs fully inflated with air, many of these little lives may be saved.

Among the other lesions in the chest were noted catarrhal and interstitial pneumonia, pulmonary œdema, beginning abscesses in the lungs, pleurisy, and hemorrhagic effusion into the pleural cavity. The heart, in some, contained blood-clots, ecchymoses in its substance, and hemorrhages in the endo- and pericardium. In some the heart-muscle was pale. In one the foramen ovale was partially open, and in another the aorta curved to the right. The liver showed various conditions. It was bile-stained and yellowish-brown, enlarged and hyperemic or cirrhotic, ecchymotic, fatty, or contained small abscesses. The gall-bladder, in one, was distended and its duct obstructed by mucus. The spleen was anæmic, or deeply congested, or enlarged and firm, or the seat of splenitis. The kidneys were anæmic, or congested, or succulent, or the seat of interstitial and parenchymatous nephritis, or of urate infarcts. In one difficult labor case the kidney was ruptured. One kidney was displaced. The stomach was anæmic, or congested, or distended with gas. In others it was small, or the seat of catarrhal gastritis, or contained blood and mucus. The intestines were anemic, or congested in parts, or the seat of bloody extravasations. They were distended with feces or gas. In two cases the children were born with imperforate anus and rectum. In one case there was intussusception. The descending colon was bound down by adhesions in one, and, in another, the duodenum passed through the head of the pancreas with consequent obstruction. The brain showed anemia, or softness, or congestion, or thinning of its substance. The meninges were inflamed or the seat of hemorrhage. The ventricles contained an excess of fluid or blood. One case showed sub-aponeurotic and sub-dural clots, while another showed ecchymoses and staining of the occipital bone. The peritoneum was the seat of acute diffuse peritonitis with serum and fibrin in the abdominal cavity in several cases. In one there was matting of the liver, intestines and gall-bladder. The skin was ecchymotic in four cases, jaundiced in three cases, and, in single cases, the seat of pemphigus, erysipelas, and umbilical abscess. Among the rarer findings might be mentioned cleft palate, œdema of the glottis, abscess of the mammary gland, hypospadia, blood particularly dark colored, bloody

liquid in the uterine cavity, bloody oozing from the nose and mouth, thrombi in the hypogastric arteries, blood-stained serum and mucus in the trachea and bronchi, purulent inflammation of the umbilical vein and branches of the portal vein, and general enlargement of the lymphatic glands.

In endeavoring to trace the relationship between the nature of the labor and the post-mortem findings the writer defers from making sweeping deductions because of the paucity of the material at his disposal. A number of interesting facts, however, are easily discovered. The large number of hemorrhages present within the cranium and in the various organs of the chest and abdomen again emphasizes the fact that the blood-vessels of the fully-developed child are very delicate and cannot be roughly handled with impunity. The occurrence of fractures of the various bony parts reminds us of the natural fragility of these structures.

That fractures and impressions of the child's skull caused by labor are by no means rare is proved by the fact that Rosinski (Ztschr. f. Gebtsh. u. Gynäk., 1893, xxvi. 255) was able to collect no less than forty-four cases in which sixteen children were born alive. Many of these children naturally die, although, if no other complications are present, such children may grow up. The older methods of treatment by suction and trephining were followed by such dismal results that they have been practically abandoned. In very recent times, however, a successful case of trephining and raising the depressed bones in a newly-born child after the use of forceps has been reported in this country by Irving W. Smith (N. Y. Journ. of Obst., May, 1893, p. 712). The frequent occurrence of meningitis pleuritis and peritonitis recalls how easily prone the serous-membranes are to undergo inflammatory changes in the fetus as well as later in life. The occurrence of organic changes in the heart, lungs, liver, kidneys, spleen, stomach and intestines lays stress on the importance of keeping these organs in view. The possibility of ruptures and displacements of such organs as the liver, spleen and kidneys must be borne in mind. Taken all in all, we must remember, during the progress of labor, that the ensemble of a child about to be born consists of a mass of delicate organs and tissues, and that any unnecessarily rough handling may be followed by the loss of a human life.

For fuller details and the relation of the labor to the pathological

conditions found in the individual cases, the reader is referred to the histories in detail. Suffice it here to state that the majority of cases of death were due to difficulty in delivery due to obstructions arising from the mother or child. As this is a small selected series of cases, too much stress must not be allowed this fact, for we know that one of the most important causes of infantile death is due to prematurity or congenital debility of the child without regard to the nature of the labor. Still, if the art of obstetrics can be so perfected as to overcome the obstructions caused by mother or child during labor, a great many lives of children may be saved in the future which are now sacrificed.

CHAPTER IV.

CAUSES OF INFANTILE MORTALITY.

In studying the etiology of our subject the writer* again availed himself of the records of the Bureau of Vital Statistics. The causes of death in two hundred and one cases of still-birth at term were noted. As in the majority of these cases no autopsies were held, the conclusions are only approximately true. The same might be said of the ninety-nine children which were born alive, but died after a period of time ranging between a half hour and five days.

CAUSES OF DEATH IN TWO HUNDRED AND ONE STILL-BIRTHS AT TERM.

CAUSE OF DEATH.	ALONE	COMPLICATED.
Asphyxia Neonatorum	16	17
Protracted Labor	31	36
Precipitate Labor	1	1
Malpositions	27	30
Maternal Diseases, Abnormalities, Deformities or Accidents	23	24
Fetal Abnormalities	15	15
Abnormalities of Placenta and Membranes	10	10
Abnormalities of Cord	31	53
Artificial Delivery	13	15
	167	201

As death was rarely due to a single cause, the second column really more nearly represents the truth. Thus a case of artificial delivery as a rule would presuppose a protracted labor, a possible malposition, and a condition of asphyxia. Still the writer has tabulated the causes as they were given. As protracted labor and asphyxia really go hand in hand, we find that, in the two hundred and one cases, fifty-three or twenty-six per cent. of all the still-births at term were due to this combination. An equally potent factor in causing still-births lies in the umbilical cord-prolapsus, coiling or knotting. Here compression of the cord cost the life of fifty-three children among the two hundred and

*With the kind assistance of Dr. M. Silverman.

one, or again twenty-six per cent. The malpositions included breech, transverse and brow presentations in the order of frequency. Maternal abnormalities included deformities of the pelvis, diseases or accidents. The fetal abnormalities embraced variations from the normal in size and number, diseased states—such as hydrocephalus or spina bifida—and one case of fracture of the fetal skull. The abnormalities of placenta and membranes were represented by placenta previa, degenerations of the placenta and hydramnion. The artificial deliveries referred to forceps, version and craniotomy. As the cases of transverse presentations properly belong to the list of artificial deliveries, we find that in thirteen per cent. of the cases where such interference was necessary the children were born dead.

Causes of Death in Ninety-nine Children Born Alive, but Dying Within Five Days.

CAUSE OF DEATH.	NO. OF CASES.	COMPLICATIONS.	LIVED.
Prematurity	43	Atelectasis Placenta Previa Cyanosis Cerebral Hemorrhage Pulmonary Œdema Maternal Injury Convulsions	½ hr. to 5 dys.
Protracted Labor and Asphyxia	18	Forceps Delivery Deformed Pelvis Breech Convulsions	½ hr. to 3 dys.
Congenital Feebleness . . .	17	Convulsions Maternal Phthisis Atelectasis	1 hr. to 5 dys.
Convulsive Disorders	7		1 to 5 days.
Various Causes	14		½ hr. to 5 dys.

In this list, if we combine the children which were born alive, but died from prematurity and congenital feebleness, we find the startling number of sixty, or more than one-half. As stated before, Eröss, in investigating a much larger number of cases in European cities, reached almost an identical result, for he found that 54.24 per cent. of deaths occurring in children under four weeks were due to congenital debility, including prematurity. The fact that nearly eighteen per cent. of the children resuscitated after asphyxia, died within three days, again emphasizes the fact of the dangers of this state and the necessity of making sure that the obstacles to the respiration have

been permanently overcome, and of persevering in our efforts, at intervals during the first days of life, where there is any doubt regarding the matter. Convulsive disorders carried off at least seven per cent. of the children. As this usually represents hemorrhages in the cranial cavity, the necessity of care becomes all the more apparent in handling the fetal skull. The various other causes, grouped together, included solitary instances of bronchitis, jaundice, abnormalities of the urinary tract, paralysis of the throat, entero-colitis, patent foramen ovale, hydrocephalus, tetanus neonatorum, hernia cerebri, hemophilia, umbilical hemorrhage, imperforate anus, and syphilis.

CHAPTER V.

INFANTILE MORTALITY DUE TO MATERNAL CAUSES.

PRECEDING LABOR.

Although this essay is chiefly concerned with infantile mortality occurring during labor, it may be interesting to rapidly pass in review the large number of causes which usually sacrifice the lives of tens of thousands of immature children. Febrile affections, excessive anemia, nerve irritability, and strong mental emotions; all frequently result in abortion or premature delivery. Various conditions emanating from the uterus directly, rigidity of its walls from fibroma or carcinoma, old peritoneal adhesions, old pelvic cellulitis, may produce the same result. Hyperemia of the gravid uterus, leading to rupture of the blood-vessels and premature expulsion of the ovum or fetus, may result from inflammatory affections of this organ and adnexa; excessive coitus, valvular lesions of the heart, pulmonary and hepatic obstructions to the circulation, and the various acts of vomiting, coughing and straining, or jolting of these parts arising from railway journeys, or violent exercise, may all be followed by the same result. Similarly, disease of the fetal appendages (umbilical cord, chorion, amnion, and placenta) and of the decidua, due to hypertrophy or atrophy of the uterine mucosa, may induce the same termination.

Without entering into further details regarding the subject of abortion, for it is beyond the scope of the present subject-matter, we pass on to the consideration of those conditions which emanate from the mother, and result in the destruction of the viable child. And, in discussing these conditions, the writer wishes expressly to state that minute details, especially regarding pathology, symptomatology, and diagnosis, will be only lightly alluded to, as they are fully elucidated in all text-books. On the other hand, everything in the interest of the infant, prognosis, treatment (actual and preventive), will receive as full attention as the author is able to give it. As the experience of one individual, no matter how great, can never do full credit to such

an extensive subject, the writer has not hesitated to draw upon recent literature, especially that of the last four or five years, to give us the latest phases of treatment looking toward the welfare of the unborn or newly-born child.

Previous to labor the death of the living child may be due: (1) To the death of the mother herself; (2) To constitutional diseases (syphilis, tuberculosis, malaria); (3) To organic diseases (as of the heart or kidneys); (4) To acute diseases (as typhoid fever, pneumonia, cholera, and septicemia); (5) To chronic disorders of the chest; (6) To diabetes, icterus, chorea, and poisoning in lead and tobacco workers; (7) To hyperemesis and to maternal shocks or injuries; (8) To extra-uterine pregnancy; (9) To uterine diseases (endometritis); and (10) To placental derangements (such as inflammation, syphilitic degeneration, placental separation with antepartum hemorrhage, and placenta previa). We will now consider these conditions more in detail.

1. MATERNAL DEATH BEFORE THE ONSET OF LABOR.

The fact that the mother has died does not justify us in sacrificing the life of the unborn babe. This principle has been recognized from time immemorial, and, in ancient times, certain nations made it obligatory to remove the living child from the womb of the dead mother. This was the origin of the Cesarian section. There has always been a feeling of repugnance in the physician and laity at large to mutilate the body of a woman just expired; but we must look conditions squarely in the face and, if we wish to lower our rates of infantile mortality, every condition must be taken into consideration. The statistics gathered of this operation are uniformly bad. According to Playfair, Schwartz has collected 107 cases without a living child; and Duer collected fifty-five cases, of which forty-four were extracted alive, but ultimately succumbed. Charpentier refers to the statistics of Heymann and Lange, in which, of 331 operations, only six or seven children were saved, and thirteen lived but a few hours. Joseph Bäcker (Centrbl. f. Gyn., 1894, No. 24, p. 569) recently reports the extraction and ultimate success with a living child, extracted after the mother had died of chronic atrophy of the heart with chronic pulmonary œdema; and refers to a second case, extracted dead at the same clinic, in a mother just dead from purulent meningitis. He also refers to the more favorable statistics of Pusch, in which forty-three living children were ex-

tracted in 453 operations. V. Hecker saved a child after post-mortem Cesarean section (Arch. f. Gyn., 1876, p. 537). Pinard and Varnier report post-mortem Cesarean section in an eclamptic primipara, and also another case at eight-and-a-half months (Etudes d' Anat., obst. norm. et path., Paris, 1892, p. 57). Gener extracted a living child recently under similar circumstances (Cent. f. Gyn., 1894, xlii., 1050). In this country the operation has not been done often, although O'Callaghan (Med. Rec., 1891, xxxix., 513) recently operated a dead woman, but without success. The great obstacle to the success of this procedure depends on our inability to locate the exact moment of death, and to operate on a dying woman would be practically hastening maternal death. Breslau (quoted by Charpentier) has arrived at the following conclusions from experiments on animals:

1. The fetus survives the mother in cases of sudden death—as from hemorrhage, asphyxia, apoplexy, etc.

2. The human fetus survives sudden maternal death longer than the animal fetus.

3. There is little chance of saving the child if the operation is deferred longer than fifteen or twenty minutes after maternal death.

4. In death from essential fevers we cannot hope to save the infant; the same is true of deaths from poisons, excepting chloroform.

The operation, then, is indicated in cases of maternal death from pulmonary and cardiac affections, and cerebral embolism previous to the onset of labor. During labor, maternal death previous to dilatation of the cervix, from hemorrhage, exhaustion, eclampsia, or rupture of the uterus, offers the indication for opening the abdomen and removing the child. (Lusk.)

2. CONSTITUTIONAL DISEASES OF THE MOTHER.

These embrace chiefly syphilis, tuberculosis, and malaria. Of these, by far the most important is maternal syphilis. *Syphilis* may result in the premature death and expulsion of the fetus by directly vitiating fetal nutrition. Or a form of fever—called by Lusk "Syphilitic fever"—may be induced, and destroy the child. Or the placenta may undergo degenerative inflammatory changes in the tunica intima of the blood-vessels, or granular degeneration of the placental villi with obliteration of the blood-vessels; or changes may occur, such as described by Frankel, and designated as endometritis placentaris gum-

mosa and endometritis decidualis. The fetus then dies from lack of adequate nutrition.

The prognosis to the child is serious. Of 657 syphilitic females, according to Charpentier, 231 miscarried, while 426 were delivered at term of living or dead children. The fact that children are born alive does not guarantee them free from the disease, for, as is well known, many of these children may develop the characteristic symptoms of the disease several weeks or months after birth and either perish or survive. The writer would like to point out a fact not usually mentioned by authors. As has been pointed out by Fournier, latent syphilis may result in abortion. But the author has had the experience in a number of women whose husbands had latent syphilis—that is, no outward manifestations of a formerly acquired syphilis were evident, and the mothers showed no evidence of the disease—that, although the children were felt to the last moment and the labors were fairly easy, such children were frequently born dead and no amount of effort could succeed in resuscitating them. The author is inclined to explain this phenomenon by the fact of congenital weakness of the fetal heart from the inherited disease, so that these children have not sufficient vitality to resist the ordeal of an ordinary labor.

Syphilis may be acquired before conception. This predisposes most to abortion. Hence the necessity of early, thorough and protracted anti-syphilitic treatment by means of mercury and iodide of potassium after the manner acknowledged by all authorities in modern times. Syphilis may be acquired simultaneously at the moment of conception. Here, again, abortion or premature delivery is the rule. Hence vigorous treatment must again be resorted to, although the result is doubtful. The woman may contract syphilis only after the fourth or fifth month of pregnancy. In these cases delivery is often premature, but treatment offers better prospects. Where syphilis is acquired at the termination of pregnancy there is usually no danger to the child, and treatment is then instituted in the interests of the mother. The fact of syphilis affecting the ovum without affecting the mother has been questioned by many, but we believe the occurrence possible, although it interferes with instituting timely treatment. In all instances where the male has been recently infected with syphilis and the wife has shortly afterwards conceived—whether she present symptoms or not—both ought to be put under a thorough and pro-

longed course of anti-syphilitic treatment. Again, where a woman repeatedly aborts or gives birth to dead children, we agree with Fournier in regarding the parents as probable subjects of latent syphilis, and during the entire course of pregnancy would persist in the use of the same treatment. This eminent authority and others have had successful results by following out this plan, and as the treatment is eminently tonic in character, no harm can accrue from its use. The writer similarly knows of several instances where women have repeatedly aborted four to six times, and then, after a thorough course of treatment, have given birth to healthy children.

Tuberculosis.—Lusk says that the advanced stages of phthisis prevent conception, but in two women whom the author attended in labor, who were suffering from advanced pulmonary phthisis with cavities, one of them gave birth to a decomposed fetus at the end of the seventh month, and the other was delivered at term of a small puny baby which died within a short time. Children born of such mothers are generally feeble. They are said to become first scrofulous and then tuberculous. Ortega (Charpentier) observed 95 tuberculous women in 185 pregnancies; 95 went to term, and 37 ended in miscarriage or premature delivery. How far the offspring of mothers suffering from mild or incipient phthisis are affected has not been determined; although it is claimed that pregnancy hastens its development and progress; but it is quite likely that such children inherit a soil upon which the tubercular process may readily engraft itself in later life.

Malaria.—This disorder has been accused of producing many miscarriages and premature births. According to Göth (Ztsch. f. Gebtsh. u. Gyn., vi., 17), in 46 cases, 19 terminated either in abortion or miscarriage. Some authors claim that the fetus in utero may be attacked by the disease. This has been proved at autopsies by enlarged spleens and malarial pigment granules in the blood and skin of children dying before or immediately after birth. (Max Runge Volkmann's Samml., No. 174, p. 10.) The author knows positively of one lady, subject to chronic malaria, who developed an irregular continuous fever, interrupted by occasional chills, and resulting in premature deliveries on two occasions at seven months. This lady later gave birth to two healthy living children at term. As the malarial cachexia antedated marriage and no other condition was present to account for the

premature births or the fever, the diagnosis was safely made by exclusion.

The treatment of this condition consists in the free exhibition of quinine, and, although many are opposed to the use of this drug on account of its well-known oxytocic qualities, certain authors (Grandin) urge its free use and deny any influence in interrupting pregnancy.

3. ORGANIC DISEASE OF HEART OR KIDNEY.

Organic disease of the heart or kidneys may be responsible for the premature death of the fetus in utero.

Cardiac Diseases.—It is wonderful at times to see how many children a woman with advanced cardiac disease can bear to term and then nurse. The author has had a number of such experiences. One woman with a very pronounced mitral insufficiency and hypertrophy of the heart has successfully given birth to five children, although the author suffered great anxiety for her life with the first. Another lady, who was forbidden marriage on account of advanced heart-disease, successfully gave birth to four living children before compensatory hypertrophy ceased and carried her off. The result to the child is not always, however, so fortunate. One lady, who had given birth to a living child at term, was so affected by the inability of her heart to do increased work, that she was taken with pains during the eighth month, and had to undergo a very difficult labor before she could be delivered of a child which had been dead for some time. The mother herself succumbed twenty-four hours later.

Cardiac disorder is apt to show itself in an acute form during pregnancy as ulcerative endocarditis, which is, of course, fatal to both mother and child. One case of acute ulcerative endocarditis in a still-born child will be found referred to in my list of autopsies, but unfortunately no details regarding the mother were to be had. The chronic forms during pregnancy result in augmented arterial pressure, owing to utero-placental circulation, or to pressure of the uterus on the aorta, or to the plethora of pregnancy, with limitations of the intra-thoracic space by the pressing up of the diaphragm. According to Charpentier, premature delivery and abortion, and the death of the fetus, occur either directly on account of the mother's affection or in consequence of changes in the placenta. Statistics quoted by Charpentier show twenty-one miscarriages among forty-one women with heart

disease of which five were delivered at six months and thirty-seven of the children born alive died before reaching five years. Among 220 cases collected by Courrejol and Porak, 128 only were delivered at term (Charpentier).

The moral learned is that women with advanced heart disease must either not marry or avoid pregnancy in the interests not only of themselves, but of their offspring.

Nephritis, Albuminuria, Eclampsia.—Owing to the unsettled condition of our pathological knowledge we prefer to consider these allied states in one group. Although the uræmic or eclamptic state may only develop during or after labor, it may likewise manifest its existence previous to full term at the beginning of labor. Thus, in one case of eclampsia which the writer saw with several other physicians, the convulsions rapidly passing into coma developed during the seventh month of pregnancy. After bi-manual version the mother rapidly emerged and became well; but the child died shortly afterwards of congenital debility. The writer very recently resorted to accouchement forcé in a similar case, but lost the child.

In 52,000 births, Lohlein (N. Y. Med. Wochensch. vi., 1894, p. 230) found 325 cases of eclampsia. In 177, or 71 per cent., operative interference was required to deliver the child. Bitter reports 455 cases of eclampsia, of which 30 per cent. terminated prematurely and 26.9 per cent. of the viable children were born alive (Arch. f. Gynäk. 1893, p. 165). In 50 cases of eclampsia, Gener reports 16 still-births (Cent. f. Gyn., 1894, xlii., 1050). Although the proguosis as to the mother is bad (14 per cent. mortality), that to the child is worse. According to Lusk fully one-half of the children are born dead. This is probably due, as pointed out by this writer, to the accumulation of carbonic acid gas in the blood of the mother resulting in asphyxia of the unborn child. As this result depends on the number and duration of the attacks, it is evident that the danger to the child is greatly diminished if the eclamptic state only develops at the end of the first stage of labor when it is possible to resort to rapid extraction.

Hoffmeier (Charpentier) has made a careful study of eclampsia alone or occurring in connection with nephritis. In thirty-three cases of nephritis, complicating eclampsia, twenty children were born dead and fifteen were born alive. In 104 cases of nephritis alone sixty-two children were born dead and forty-six living. So that in the total of

137 cases, eighty-two of the children were born dead and sixty-one living. Charpentier (Arch. de Tocolog., 1893, p. 509, or Am. J. Med. Sc., Feby., 1894, p. 222) has recently collected 454 cases of eclampsia and found that 162, or 36.12 per cent., died before or during labor. Depaul found that, in the great majority of cases, women attacked with epileptiform convulsions were confined prematurely. Hall Davis in thirty-six cases found ten still-births (Playfair). In 748 cases of eclampsia collected from various sources, 399 of the children died. The causes of infantile mortality in this disease are attributed by Charpentier to the convulsions directly—for, as claimed by Cazeaux, the convulsions may attack the child in utero—to blood disturbances, to asphyxia, to apoplexy in the brain or cord, to blood poisoning, to peritonitis, to arrest of circulation in the placental blood-vessels, to uremia and to hyperpyrexia.

The prognosis then to the child is pretty bad. Regarding treatment authors are divided. Some favor diuretics, purgatives, venesection and measures of this type (Playfair); others advise the use of large doses of morphine (Lohlein) which are claimed not to be dangerous to the children. Charpentier advises venesection, chloral, forceps, etc., and warns against interference until the parts are dilated or dilatable. Once convulsions have set in, it seems that there can be no question—certainly regarding the interests of the child, and, with good reason, in the interests of the mother also—that the sooner the uterus is emptied and the maternal circulation relieved, the better for both. The writer makes this statement advisedly, knowing that certain authorities claim that it is better not to force matters at such a crisis. Although it has been the sad experience of the writer to lose the mother in a case of eclampsia which only developed several days after delivery, still he is firmly convinced, from experience in a number of other cases, that the rapid emptying of the uterus where spontaneous delivery seemed too distant—by accouchement forcé, version or forceps—has been followed by an immediate relief of the threatening or actual convulsions, and a number of infantile lives were saved which unquestionably would have been lost by temporizing. Therefore, although it is our duty as physicians to concern ourselves primarily with the safety of the mother, we are justified in the presence of this disease to act from a double standpoint by which we make every effort to save the child as well as the

mother. At the Leipsic clinic these principles are followed out thus (B. Krögnig-Cent. f. Gyn., No. xvi, p. 375): Narcotics are only used during actual operations; accouchement forcé is resorted to with the object of hastening delivery; venesection is used for threatening pulmonary œdema.

CHAPTER VI.

MATERNAL CAUSES PRECEDING LABOR—(Continued.)

4. ACUTE DISEASES.

Typhoid, Typhus or Relapsing Fevers.—The mother may suffer from a variety of acute diseases which may terminate in the death of the child previous to birth. Among the chief of these are typhoid, typhus or relapsing fevers. These fevers usually complicate the earlier months of pregnancy (Monatsch. f. Gebtsk., xxxii., 1867, p. 253). Of three hundred and twenty-two cases of typhoid fever occurring during pregnancy, one hundred and eighty-two ended in abortion or premature birth (Charpentier); so that these fevers have a very decided influence in terminating pregnancy prematurely and causing the loss of the child. All writers are agreed that the large infantile mortality is due to hyperpyrexia. Of course the preventive treatment looking toward the safety of the child depends entirely on the treatment of the mother. This is true of all acute or chronic diseases previous to the onset of labor and will not be further entered upon in this essay.

Pneumonia.—The author has seen a number of cases of pneumonia occurring during pregnancy at about the seventh or eighth month. Two cases miscarried at this time resulting in the death of the child, but the amelioration in the condition of the mother was wonderful. In another case, however, the mother miscarried, but eventually died. The life of the child is very much compromised in this disease. Charpentier refers to twenty-eight cases in which the disease developed before the 180th day and terminated in eleven miscarriages. In fifteen cases occurring after the 180th day there were ten premature births. This means that pneumonia during pregnancy causes the premature expulsion of the ovum or child in one-half the cases—a mortality of 50 per cent. According to Speigelberg the death of the fetus is caused by deficient oxygenation of the maternal blood, by placental anemia due to inadequate supply of blood to the left heart, and by the abnormally elevated maternal temperature.

Cholera.—We have been fortunate in recent years to avoid an

epidemic of this disease. According to the researches of Bouchet and Hennig, abortion, in those who survived the disease, occurred in more than one-half the cases during pregnancy. In one hundred and twenty-three cases collected there were seventy-one miscarriages (Charpentier). Lusk says that pregnant women are most prone to this disease in the latter months of pregnancy. The prognosis to children born before the ninth month is almost necessarily fatal.

The fetal pulse has been observed to become feeble and intermittent in this disease. (Hüter, Monatsch. f. Gebtsk. xviii., 1862, p. 23.)

Granular degeneration of the fetal placenta and almost complete degeneration of the epithelium covering the villi are said to be active in causing the death of the fetus (Slavjansky-Arch. f. Gyn. iv., 1872, p. 293).

Septicemia, occurring prior to the beginning of labor, has been the cause not only of the death of the fetus in utero, but of the mother also after delivery in two cases known to the writer. In one of these cases gangrenous endometritis was present as the underlying cause. Still Loviot recently reports a living child in a case of pre-natal septicemia (Bull. et Mém. Soc. obst. et gynéc. de Paris, 1892, p. 12).

Contagious Diseases.—The various contagious diseases, such as variola, scarlatina, rubeola, and erysipelas, may occur during pregnancy and may be responsible for fetal death previous to the time of normal labor. In small-pox of the confluent variety abortion is almost invariably the rule. The child may die previous to birth, or succumb shortly after birth, or be born with the pustules characteristic of this disease. During epidemics all pregnant women should be vaccinated.

Scarlatina during pregnancy is a very rare disease—only seven cases being collected by Olshausen (Arch. f. Gynäk. ix., 1876, p. 169). It terminates in abortion or miscarriage in every case (Charpentier).

In fifteen cases of **Measles** occurring during pregnancy there were eight premature births (Bourgeois—Charpentier). It is said to tend to produce metrorrhagia fatal to mother and child (Lusk).

Erysipelas occurring during pregnancy very frequently interrupts this state and terminates in abortion or miscarriage. There are cases on record in which the disease seems to have been carried from the mother to the fetus in utero. (Kaltenbach, Centralbl. f. Gynak., 1884, No. 44; Lebedeff, Ztschr. f. Gebtsk. u. Gynak., 1886, xii., p. 321.)

5. CHRONIC DISORDERS OF THE CHEST.

We have elsewhere considered such chronic diseases as syphilis, tuberculosis, malaria, and organic diseases of the heart and kidneys. There are a number of other diseases, however, which deserve a short notice.

Emphysema, Chronic Pleurisy, Chronic Bronchitis and Empyema, deserve a word in passing, because, in the pregnant state, they may cause sufficient disturbance to end prematurely the existence of the unborn child. They are occasional accidental complications of pregnancy, which, according to some authors, may, in the interest of the mother, at times justify the induction of premature labor.

6. DIABETES, ICTERUS, CHOREA, AND POISONING IN LEAD AND TOBACCO WORKERS.

Diabetes complicating pregnancy is a rare condition and few cases are on record (Matthews, Duncan, Obst. Trans., xxiv., p. 256). Hydramnion is frequently present, and, in one case, sugar was detected in the fluid accumulation. In seven out of nineteen pregnancies the child died after reaching a viable age. In two others the child was feeble at birth and died a few hours later. In one case the child was diabetic, so that, taken all in all, the diabetic condition offers a serious prognosis for the child in utero.

Icterus during pregnancy may sometimes occur in epidemics or may precede acute yellow atrophy of the liver, or may be met with in connection with phosphorus poisoning. In epidemic form forty-two out of sixty-eight women miscarried (Charpentier). Davidson (Monatsch. f. Gebtsk., xxx., 1867, p. 465) attributes the fatal influence during pregnancy to impairment of the renal excretory functions, the hydremia of pregnancy, and the impairment of cardiac activity. Icterus often produces abortion by destroying the life of the fetus, as proved by the intense icterus of the dead fetus, biliary acids in its blood, and the exclusion of other causes (Schroeder).

Chorea.—According to Goodell (Am. J. of Obst., viii., p. 168) chorea exercises a baneful influence on the child in utero, in that one-half of the pregnancies are terminated prematurely. In fifty-seven cases of Barnes nineteen terminated in abortion or premature delivery.

Even where the life of the child is not sacrificed it may become affected with the disease.

Lead and Tobacco Workers.—In pregnant women working at lead Constantin Paul (Charpentier) states that seventy-three children were born dead in one hundred and twenty-three pregnancies. In tobacco workers, of which we have many in this country, miscarriages are very frequent, and the children born alive are short-lived. Jacquement noted forty-five cases of abortion and premature delivery among one hundred women working at tobacco, and fifteen died shortly after birth. Of those children born alive fully one-quarter died during the first year. (Kostial—Charpentier.)

7. HYPEREMESIS, AND MATERNAL SHOCKS AND INJURIES.

Hyperemesis.—This is recognized as a very serious complication of pregnancy at times. Although, in the vast majority of cases, vomiting is regarded as a normal concomitant of the pregnant state, this symptom may, at times, become so alarming as not only to jeopardize the life of the child by the straining efforts, but also that of the mother. It becomes important in the interests of the child to check the symptoms, if excessive, by the various means at our disposal. Careful dieting, assisted by the use of drugs, will, in the majority of cases, keep this distressing symptom under control. Where the life of the mother becomes endangered it is considered justifiable to risk the interruption of the pregnancy by dilating the os (Wylie's method), or of actually inducing abortion or premature delivery by cleaning out the uterine cavity. As this means the death of the child, we, as physicians, must use every available means at our command before resorting to this extreme measure.

Maternal Shocks or Injuries are responsible for many abortions, premature deliveries, and still-births. Of one hundred and sixty-seven still-births at term the writer found six attributable directly to maternal shocks or injuries. In the earlier months pregnancy is much more easily interrupted, and it is no exaggeration to claim that a very large proportion of the miscarriages and premature births which the busy practitioner meets with each year are directly traceable to a shock or injury. Hence the necessity of warning the pregnant woman from undertaking journeys in this state, undertaking laborious exercise or work, or in any way straining the body so as to interfere with the

delicate system of blood-circulation existing between the ovum or placenta and the endometrium. Brown recently calls attention to the frequent occurrence of malposition after falls (Lancet, 1891, p. 258). Where the mother suffers accidents or blows or kicks directly to the abdomen the child may be instantly killed and expelled at once or not for days. It is just necessary to allude to the premature loss of infantile life from criminal abortion without attempting to expatiate on the subject.

8. EXTRA-UTERINE PREGNANCY.

Extra-Uterine Pregnancy, up to a recent period, implied the necessary death of the fetus. In the early stages of this condition, the sacrifice of the child is at present—in view of the danger to life incurred by the mother—regarded as indisputably justifiable. This is accomplished by the majority of gynecologists chiefly by abdominal section and removal of the entire sac, or a small minority resort to the methods of electrical destruction of the fetus relying on subsequent absorption. If the pregnancy has advanced to a viable stage the opinion prevails, among those best able to judge, to wait until the expiration of pregnancy and then, by performing celiotomy, to endeavor to extract the living child. This practice is more commendable than the old practice of leaving the case to nature in the hope of a lithopedion resulting, for it not only removes the mass at once and spares the mother the risks of absorption from a possible putrefying and liquefying fetus, but regards the interests of the child as well. Werder recently reports a successful case of celiotomy where the fetus was viable (Med. Rec., Nov. 24, 1894, 641).

9. UTERINE ABNORMALITIES.

Abnormal States of the Uterus.—As mentioned elsewhere, inflammation of the uterine mucosa, if it do not prevent conception, frequently causes the premature expulsion of the ovum or fetus. Carcinomatous disease of the pregnant uterus tends to premature expulsion of the fetus (Playfair). In carcinoma, Lewes noted forty per cent. abortions in one hundred and twenty cases. Colmstein found only sixty-eight deliveries at term in one hundred patients (Charpentier). Prolapse of the uterus may be responsible for fetal death. In fifty-seven cases referred to by Charpentier, nineteen children were born alive, fourteen dead, and twenty-four not noted. A sudden displacement may lead to abortion through uterine congestion and

hemorrhage. Lusk advises immediate replacement by tampons. In a number of cases of prolapsus and displacements, in which the women repeatedly miscarried, the writer successfully resorted to the use of an ordinary Hodge pessary, not removing it until actually labor had set in, although it is not necessary to retain it so long. Hernias of the pregnant uterus—which are chiefly umbilical or ventral—are frequently the cause of abortion or premature delivery. The treatment consists in replacement and retention.

Diseases of the Decidua may prematurely terminate the existence of the ovum and fetus, and are divided by Lusk into three varieties,—endometritis decidua chronica diffusa, End. dec. tuberosa et polyposa, and Endometritis catarrhalis (gravidarum). Although pregnancy may proceed to term in the first, it frequently induces abortion or premature delivery by causing the death of the fetus through interference with its nutrition or by exciting reflex uterine contractions. In the second variety the fetus is generally dead and partially disintegrated. Therefore, there is usually early abortion. The third form, hydrorrhea, chiefly involves the decidua vera. This may also induce abortion or premature delivery.

Hydramnion.—The amniotic liquid may be present in quantity at times too small, at times too large. When present in too small quantity it is of interest to us chiefly because it may lead to feto-amniotic bands which, by mechanical compression, may injure the fetus in various ways or result in spontaneous intra-uterine amputation. It is with the excesses of amniotic liquid, however, that we are chiefly concerned. Hydramnion may be either acute or chronic. Syphilis is frequently associated with it; but the writer, from personal knowledge, is convinced that this is by no means a universal cause. Recent opinions regard the excess of liquid as of fetal origin and the fact of the presence of urea would leave little room for doubt but that the fetal bladder empties itself directly into this liquid. The majority of cases of hydramnion terminate pregnancy prematurely. This is due to the death of the fetus, to separation of the placenta, or to over-distension of the uterine cavity.

The diagnosis of this condition would seem easy, but this is not always the case. The writer saw with another physician a woman, whose statements regarding a history were unreliable. She had an immense distension of the abdomen, causing the most distressing dyspnœa,

preventing the woman from lying down, and only dating back three or four months. With no albumin in the urine the diagnosis of ascites or possible large ovarian cyst was made. There were no symptoms and no suspicion of pregnancy after careful examination by fingers, hands, and stethoscope. As immediate action was indicated, an attempt to relieve the distension through the abdomen was made, but failed because the trocar opened a vein from which the blood oozed. Within twenty-four hours there was a spontaneous gush per vaginam of an immense quantity of amniotic liquid and the patient gave birth to twins of three to four months' development. After passing through an attack of fever she ultimately made a good recovery. This case was seen by a number of able physicians during its course, and not one of them suspected pregnancy.

The prognosis to the child is serious because of malformation, dropsical affections, prematurity, and faulty presentations. According to Lusk nearly one-fourth of the children are lost. McClintock found that of thirty-three cases, nine children were born dead, and of the others born alive ten died within a few hours. Charpentier refers to forty-three mal-presentations (breech twenty-one, shoulder twenty, face two) in one hundred and nine cases. He refers to nine dead children in forty cases collected by Liegener.

The treatment in bad cases, unfortunately, is destructive for the fetus, for, in the interests of the mother, authorities advise puncturing the membranes per vaginam and allowing the amniotic liquid to escape. As this means induction of labor the chances of the immature fetus are very slim. Where possible, if the suffering of the mother is not excessive, it would be advisable to delay the procedure as long as possible. Where interference becomes imperative, it would be advisable to puncture with a small trocar or the aspirator of Dieulafoy, in the hope that, after the excess of liquor had been removed, the opening might close and the child remain in its internal surroundings until safely viable. In a case recently reported by Wœrz (Cent. f. Gyn. 17, 1894, 437), the membranes were ruptured with a sound, giving birth to twins, of which one was still-born and the other died in an hour.

Putrefaction of Amniotic Fluid.—In the case of Bordé (Bull. de Sc. Med. di Bologna, 1892, 167, 82) the fetus was putrefied and the mother died of sepsis. Briegleb reports a living child in putrefying amniotic fluid (Centr. f. Gyn., 1892, xvi. 571).

10. PLACENTAL ABNORMALITIES.

Placental Lesions.—According to the researches of Dubois (Charpentier), if a large portion of the placenta preserves its structure, little harm will accrue to the fetus. If the placental structure, however, is much disturbed, the children are apt to be born feeble or dead. This is readily understood when we remember that the fetal sustenance depends exclusively on the maternal circulation present in the placenta. In 106 cases of hemorrhage from the separation of a normally situated placenta, collected by Goodell (Am. J. of Obst.), only six children out of 107 were born alive. Placental hematomata may impair the nutrition of the fetus and cause its death by direct pressure upon the villi or from laceration of the fetal portion of the placenta with fatal fetal hemorrhage. Inflammations of the placenta may be of various types and lead to its fatty degeneration. The writer has seen several instances of this in women who repeatedly miscarried with dead children. Besides syphilis of the placenta we may get calcareous deposits, fatty degeneration, pigment deposits, cysts, fibromatous or carcinomatous tumors, and myxoma (Lusk.) All of these conditions may seriously compromise the life of the fetus, but, as the risks to the mother are likewise considerable, treatment is directed solely in her interests.

Placenta Previa.—This condition is attended with great danger to the child. More than one-half of the children are lost. The dangers arise from the risk of asphyxia from the loss of maternal blood, from prematurity, or from mal-presentation. King in his statistics from the state of Indiana (1879) found twenty-nine cases of premature delivery, of which eleven children were saved (Playfair). In 856 cases referred to by Charpentier, there were 525 premature deliveries. According to Lusk two out of three children are born dead, and more than one-half of those born living die within the first ten days. The question of treatment will be considered in the next chapter.

CHAPTER VII.

INFANTILE MORTALITY DUE TO MATERNAL CAUSES—(Continued.)

b. DURING LABOR.

We have now reached the most important stage of our work. As the ground to be gone over is very extensive and represents the bulk of the subject-matter contained in text-books on obstetrics the writer proposes to touch the maternal aspect of the subject very lightly and to concern himself chiefly with the child. Every obstruction to labor subjects the child to the danger of losing its life. Therefore it is necessary in a work of this sort to allude to all possible sources of difficult labor and, in this chapter, to those causes emanating from the mother. Such difficulties may arise from: 1, anomalies in uterine contractions; 2, dystocia due to the soft parts; 3, dystocia due to the bony parts.

1. ANOMALIES IN UTERINE CONTRACTIONS.

The labor-pains may be exaggerated or feeble, and both may be of serious import to the child.

Precipitate Labor is usually harmless, but occasionally subjects the child to danger, as the following case will show. A multipara was awakened by strong pains from her sleep and left the bed for the pôt de chambre in the belief that her bowels required evacuation. Suddenly during a strong pain the baby dropped to the floor striking on its head. The neighbors rushed in, picked up the silent baby which had a mark on its head, and brought it to. The cord was torn spontaneously, but did not bleed. The child lived sixteen hours, moaning feebly all the time. In another case, the mother, accustomed to slow labor, was sitting over a pail of warm chamomile tea with the supposed object of hastening labor, when, suddenly, during a sharp pain the baby was expelled into the pail, and owed its life to its rapid extraction from surroundings which had fortunately cooled off.

While these cases are exceptional, it is well to remember that precipitate labors offer risks to the child, which, in the majority of cases, ought to be avoided by a little care on the part of the mother and the judicious advice of the attendant. Fischer recently reports several cases of precipitate labor with simultaneous rupture of the umbilical cord. Pfeiffer also reports a similar case with inversion of the uterus (Am. Med. and Surg. Bull., Sept. 15, 1894). Fortunately the rule is that no serious hemorrhage ensues from this accident. Women having this disposition ought to avoid leaving the house when near the termination of pregnancy, and, after the onset of labor, ought to remain in bed.

Protracted Labor.—In one hundred and sixty-seven still-births the writer found thirty-one attributed solely to protracted labor. If the delay occurs in the first stage of labor all observers are agreed that there is little danger to the child. Thus, feeble pains may continue for hours or days without doing harm to the child provided the membranes are unruptured. In one hundred and thirty-three cases collected by Tarnier and others in which the first stage of labor was delayed from twenty-four to sixty hours only eight children were still-born. The treatment, therefore, may be of an expectant nature.

If the delay occurs after the waters have escaped and the cervix is fairly dilated the case becomes fraught with danger for the child after a certain period of time. Thirty years ago V. Huter pointed out that if, toward the close of a protracted labor, a rapid increase in the fetal pulse is made out, approaching death of the child may be safely inferred. While this may be as a rule, the writer would state that his experience justifies him in making exceptions. Quite frequently has it been his experience, after careful attempts at abdominal auscultation with the stethoscope, to fail entirely in discovering a fetal pulse during pregnancy and labor in cases in which a living child was delivered. Still, in cases in which the stage of expulsion is prolonged beyond eight or ten hours, the placental circulation must be disturbed and a rapid and irregular state of the fetal heart action may fairly be attributed to impending death of the child. Jacquemier places the limit of expectancy at eight or ten hours. Charpentier advises forceps delivery if the head has been arrested for an hour or two after reaching the pelvic floor. Emmet advises the use of forceps if, after the os is fully

dilated and membranes ruptured, the accoucheur finds no progress during every quarter of an hour.

As in everything else, judgment must be used. Many women are quite exhausted by the so-called "false pains" which sometimes persist for days before the onset of true labor. In such cases a hypodermic injection of morphine will be of the greatest benefit. By giving these women a chance to rest, their strength will be spared for the ordeal of real labor.

Rook calls attention to contraction of the cervix uteri about the neck of the fetus as a source of danger to the latter and a frequent cause of the prolongation of the second stage of labor. When careful auscultation of the fetal heart sounds combined with the generally delayed state of affairs reveals danger threatening to the child it is our duty to at once interfere and terminate labor. We may assist nature in these cases by a hot bath or hot douche if the membranes are still intact and os not fully dilated. In some cases of uterine inertia the hand in the vagina may act as an irritant and excite labor pains. In other cases abdominal pressure may prove of service. The writer has found a ten-grain dose of quinine very beneficial in many cases accompanied with feeble pains. Against the use of ergot most practitioners are now opposed. In thirty cases of tedious labor in which Hardy gave this drug, only ten children were born alive. This writer observed, after the administration of this drug, the fetal pulsations to drop to 100 per minute and then to intermit. The explanation is simple to any one who has once observed the tetanic condition in which the uterus passes and the evident interference with the feto-placental circulation which must ensue. In several instances when this drug was administered by midwives, the writer was obliged to immediately put the suffering women under the influence of chloroform until preparations could be made to deliver with forceps.

In many cases of tedious labor the method of fetal expression advised by Kristeller may be resorted to. In several instances, in which women had previously been delivered by forceps and were strongly opposed to their renewed application, the author has successfully made use of this method. By placing the hands firmly over the uterus and following the axis of the parturient canal the work of a feeble uterus can often be assisted to a remarkable extent. The pressure is applied at the beginning of a pain and kept up until it ceases. The writer has

never seen any harm from this—as premature separation of the placenta—but the work it requires from the accoucheur and the pain over the abdomen which it causes the suffering woman render it at times impracticable. We have then resort to that most wonderful of inventions—the obstetric forceps.

According to Playfair, the forceps, about the middle of the present century, were not used oftener than once in 310 labors. Twenty years ago they were used in the same institution as often as once in eight labors. In skilled hands this instrument has assumed such a position in obstetric practice that the lives of thousands of children are now annually saved in this class of cases which formerly must have been sacrificed. Although the writer has resorted to the use of forceps in over a hundred cases of tedious labor with normal vertex presentations, he has not lost over a half-dozen children, and these were chiefly cases too long delayed, or those which required the high application of the instrument. Therefore the writer's experience justifies him in advocating these rules: 1. If the cervix is not fully dilated, the head high, the condition of the child's heart fair, and the pelvis of ample size, the best practice is to wait and assist the expulsory forces by a dose of quinine, a hot bath, and systematic intermittent pressure applied to the fundus of the uterus simultaneously with the labor pains. Under no circumstances should the membranes be ruptured in this stage. 2. If, on the other hand, the head has emerged from the os, the waters have escaped, and labor pains are feeble or recur at long intervals, it is neglect on the part of the accoucheur not to propose the use of forceps. For now delay, although the safety of the mother may not be jeopardized, may mean death to the infant, and we have now reached that stage of modern science that requires us to look out just as carefully for the welfare of the child. The physician who boasts that he rarely needs or uses the obstetric forceps ought to retire from practice, for he belongs to a past age. This does not justify the indiscriminate employment of this instrument just to save time. For there is nothing more dangerous, for instance, to the life of the child than the application of the forceps to the antero-posterior diameter of the fetal skull at the superior straight. But we insist that the accoucheur ought never attend a case of labor without a pair of forceps close at hand and midwives ought to be taught the necessity of calling upon a physician in every case of delayed labor, even if, to their minds,

the presentation seems normal, and no visible obstruction can be made out.

Lastly, it may be well to call attention to the fact, recently pointed out by Remy, that apparent inertia uteri can sometimes be overcome, 1, by allowing more liquor amnii to escape, and, 2, by changing the position of the woman.

Ante-partum Hour-Glass Contraction of the uterus may offer serious obstacles to the birth of the child. Miller recently reported such a case during the second stage of labor, in which the uterus seemed to be divided into two spherical parts, separated by a constriction. By pressure applied to the fundus he succeeded in delivering a living child. Eames refers to a similar case in twins, in which the first child was delivered by forceps, and the second child required chloroform and version. He uses the term "Inter-partum Hour-Glass Contraction." Playfair advises resort to chloroform, and, if necessary, turning, or Cesarian section.

Literature Concerning Anomalies in Uterine Contractions.

Fischer: Precipitate Labor, etc.; Ztschr. f. Wundärzte u. Gebtsh. 1893, xliv. 246.

Siche: Death from Cerebral Injuries in Precipitate Labor, Centrabl. f. Gyn. 1894, xxxv. 856.

V. Hueter: Fetal Pulse During Labor; Monatsch. f. Gebtsk. 1862, xviii. 23.

Rook: Contracted Cervix about Neck of Fœtus, etc.; Ann. Gyn. & Pæd. 1893–4, vii. 29.

Van Waters: Inertia Uteri; N. Y. Med. Journ., lvii. 701.

Thompson: Abdominal Pressure in Tedious Labor; Bost. Med. and Surg. Journ., 1892, exxvii. 41.

Remy: Inertia Uteri; Central. f. Gyn. 1894, xxxv. 854.

Miller: Ante-partum Hour-Glass Contraction; Med. News, 1891, lix. 104.

Eames: Inter-partum Hour-Glass Contraction; Lancet, 1892, i. 630.

Also literature on Obstetric Forceps, etc.

CHAPTER VIII.

MATERNAL CAUSES DURING LABOR—(CONTINUED.)

2. DYSTOCA DUE TO THE SOFT PARTS.

Obstacles to labor, endangering the life of the child, may be met at the outlet in the parturient canal, or within the abdominal cavity.

Persistence of the Hymen may prevent the termination of labor. Ahlfeld recently reports a case and refers to twenty-four observations in twenty years. Walker mentions a case. After dividing the hymen the baby is usually quickly expelled.

Swelling and Oedema of the Vulva have, in a number of the writer's cases, offered sufficient obstruction to the progress of labor to necessitate a resort to forceps. Playfair advises a number of small punctures in such cases.

Thrombi and Hematomata of the Vulva and Vagina before delivery may result fatally to both mother and child (Charpentier). A case of hematoma obstructing labor has recently been reported by Walker.

Atresia of the Vulva, congenital or acquired, may at times cause obstruction. These atresiæ are often met with in young female children, and, when congenital, correspond to the preputial adhesions found in the male.

Prolapsus of the Vagina may in rare cases obstruct labor.

Retention of the Urine or Vesical Calculi may prevent normal delivery. The former condition is quite frequently met with and easily remedied if the head is not wedged firmly in the pelvic canal. The latter may require special operative interference. According to Winckel there are twenty-nine cases of vesical calculi on record, all of which were accompanied with more or less serious results.

Fecal Impaction may obstruct delivery. Holländer has recently made a study of the subject, and, besides impacted feces, calls attention to the occasional occurrence of proctocele, foreign bodies in the rectum, and neoplasms.

Vaginal Hernia may prove a source of obstruction. Cases have been reported in this country by Barker and Hirst.

Vaginal Atresia may be congenital or acquired. In recent litera-

ture we find a case of congenital atresia reported by Vagihita, and Goldberg reports a case of acquired annular stricture of the vagina in a woman in whom the first labor was terminated by forceps, and the second by perforation of the child's skull. Karper reports two cases of cicatricial stenosis of the vagina, requiring Cesarian section. O'Brien, Ciccone, and Gallois also report similar cases requiring operative interference. When the atresia can be relieved by stretching or cutting of bands, this should be done and followed by the application of forceps. When too pronounced, the resort to Cesarian section is justifiable.

Vaginismus and Vaginal Neoplasms may similarly interfere with normal delivery to such an extent as to delay labor and compromise the life of the child. The growths are usually carcinomata or fibromata. Harthill recently reports a case of labor complicated by a large vaginal cyst. Puech reports a similar case.

At the cervix labor may be obstructed by a number of conditions.

The premature escape of the liquor amnii naturally leaves the os rigid and small. If left to nature dilatation must be completed by the presenting part. As a dilating agent the child's head is far inferior to the bag of waters, and labor must be delayed, involving risks to both mother and child. Besides this the localized pressure from the rim of the cervix applied to one portion of the child's head instead of the diffused pressure exerted previous to the escape of the liquor amnii, tends to act detrimentally on the child, predisposing it to local cerebral congestions or hemorrhages. The exaggerated uterine pains, in many of these cases, are fearful at times in intensity, and may also cause sufficient interference with the placental circulation to seriously compromise the life of the child.

In the treatment of these cases the resort to repeated warm douches or baths is frequently of great service. The bags of Barnes or Champetier de Ribes are of unquestionable value in that they imitate the normal forces. One of the oldest and best means at our command, however, is digital dilatation.

With the disinfected fingers the os is gently but firmly stretched in all directions. If there is indication for haste in terminating labor an anæsthetic is given, and, with the hand in the vagina, the number of fingers in the os uteri is progressively increased until the closed fist can enter the dilated opening. This is the so-called accouchement

forcé. After sufficient dilatation, forceps, which act also in dilating the os, or version, may be employed to complete delivery. Unless the danger is imminent, we are opposed, after the cervix is dilated, to the completion of labor under ordinary circumstances, but would advise leaving the case to nature if the pains are strong and the general condition of the mother and child are good. Besides uterine inertia, rigid os, and premature escape of the amniotic fluid, accouchement forcé is called for at times in cases of placenta previa, uremic convulsions, albuminuria and spasmodically contracted uterus. On account of the particularly increased dangers to the child this method is opposed by such authorities as Charpentier, Winckel, Lusk, and Müller.

Rigidity of the cervix may likewise be due to organic changes. These include thrombi of the cervix, cicatrices of various kinds, hypertrophic elongation of the cervix, closure of the os externum, and new growths.

Thrombi of the Cervix are mentioned by authorities on obstetrics as being an occasional cause of delayed labor.

Cicatrices of the Cervix may be traced to syphilis, or to old lacerations, which have contracted in healing (Playfair), or to reparative operations on the cervix (Hooper).

Hypertrophic Elongation of the Cervix, although rare in occurrence, is a very serious matter when present. In the case of a woman having a cervix measuring four to five inches in length, Simpson was obliged to break up the head of the child before delivery was possible. Griffith met two cases during a practice of forty years. In one, with a cervix measuring three inches, labor was protracted, and resulted in rupture of the uterus with the loss of mother and child in fifteen minutes. In the other, a still-born child was delivered with forceps, the mother dying five or six days later. In some reported cases lateral incisions through the cervix several inches in depth were required before delivery could be accomplished. Laroyenne advises amputation of the cervix in such cases. Considering the grave risks which mother and child run in these cases we consider Cesarian section justifiable.

Complete occlusion of the os externum may be due to: (1) True cicatricial atresia or ulcerative adhesion; (2) Simple epithelial atresia or agglutination; (3) Adhesive union of chorionic and amni-

otic membranes with the maternal parts. Mattei found that thirty-six operations were necessary in forty-two patients. In twenty-eight cases of late operative interference seven children were still-born (Bain). In the literature of the last few years cases have been reported by Jardine, Landa, Cochrane, Nash, Righter, Van Zandt, and Bain.

The practice in these cases is to search for the probable site of the os which naturally must have been patent previous to pregnancy, otherwise conception would not have been possible. If the opening can be scraped through with the finger-nail or sound, this is the best practice; otherwise cross incisions must be made with the scalpel, and, if necessary, delivery must be assisted by version or forceps.

Literature Concerning Dystocia From Obstructions at Vulva, Vagina, or Cervix.

Ahlfeld: Persistence of the Hymen; Ztschr. f. Gebts. u. Gyn., 1891, xxi., 160.
Cuthbertson Walker: Obstructed Labor from Persistent Hymen; Br. Med. J., 1892, i., 1860.
Etienne: Swelling of Anterior Labia Obstructing Labor; Arch. de toco et de gynéc., 1892, xix, 203.
Walker: Hæmatoma of Labia Obstructing Labor; Br. Med. J., 1894, 162.
Hollander: Obstruction to Labor from Rectal Causes; Arch. f. Gyn., 1893, 148.
Hirst: Vaginal Enterocele; Med. News, 1891, 439.
Barker: Vaginal Hernia; Am. J. of Obst., ix.
Yaghita: Congenital Vaginal Atresia; Index Medicus, 1892.
Goldberg: Acquired Stricture of the Vagina; Central. f. Gyn, xxiii., 557.
O'Brien: Stricture of the Vagina; Trans. Texas Med. Ass., xxiii., 525.
Karper: Cicatricial Stenosis of the Vagina, etc.; Central. f. Gyn., xxiv.
Hartill: Vaginal Cyst; Birmingham Med. Rev., 1891, xxx., 103.
Puech: Vaginal Cyst; Arch. de tocol. et de gynéc., 1892, xix., 152.
Gallois: Cicatricial Atresia of the Vagina; Danphiné Med., 1891, xv., 245.
Ciccone: Artificial Section of Perineum; Prog. Med. de Napoli, 1891, v, 137.
Mesnard: Syphilis of the Cervix; Arch. de tocol., etc., 1891, xviii., 19.
Blanc: Syphilitic Cicatrices of Cervix; Arch. de tocol., etc., 1891, xviii., 241.
Hooper: Dystocia after Emmet's Operation; Aust. Med. J., 1892, xiv., 388.
Griffith: Hypotrophic Elongation of the Cervix; Br. Med. J., 1893, i., 948.
Larovenne: Elongated Cervix; Central. f. Gyn, xxiv., 592.
Jardine: Occluded Os; Br. Med. Jr., 1892, i., 962.
Cochrane: Occluded Os; Lancet, 1892, i., 358.
Nash: Occluded Os; Lancet, 1892, i., 251.
Bain: Occluded Os; Lancet, 1891, ii., 1093.
Landa: Occluded Os; Rev. de Cien. Med., Habana, 1893, viii., 73.
Righter: Occluded Os; Trans. Am. Inst. Homeop., 1890, xliii., 607.
Van Zandt: Occluded Os; Texas Cour. Rec. Med., 1890–1, viii., 141.

CHAPTER IX.

MATERNAL CAUSES DURING LABOR—(Continued.)

Growths of the Cervix obstructing labor are chiefly polypoid, carcinomatous, or fibroid. Rowland reports recently a case of labor complicated by a cervical polypus (Br. Guiana Med. Ann., 1891, 123), and Voigt was obliged to do a Porro operation on account of the impaction in the pelvic cavity of a large cervical myoma (Munich Med. Woch., 1893, xl., 409). The most frequent new growth in the cervical region obstructing labor, however, is cancer.

Carcinoma of the Cervix results in abortion in forty per cent. of the cases involved. In seventy cases at term collected by Chantreuil forty-two children were delivered dead. In one hundred and sixteen cases collected by Cohnstein, seventy-four children were born dead (Charpentier). The prognosis, therefore, for the child is very grave. According to Charpentier expectant treatment offers 62.5 per cent. chances of recovery for the child; after the use of forceps the percentage of recoveries is 50 per cent., and after version the percentage is reduced to 12.5 per cent. The trend of modern opinion is to look almost entirely to the interests of the child. Hence Cesarian section is resorted to. That this line of treatment is theoretically correct cannot be denied. The fact that the mother is suffering from a fatal disease is sufficient justification to open the abdomen and save the child at least. If possible, at the same time, the attempt may be made to remove the diseased uterus. The additional risks to the mother due to the operation itself cannot have any more weight than when the woman submits to the removal of the non-pregnant uterus for the same disease. The older treatment consisted in incising the cervix and resorting to forceps or craniotomy by which the child was usually sacrificed. Later the diseased uterus was removed. The modern and more correct treatment is to at once open the abdomen, remove the living child, and, at the same time, the diseased uterus. In the early months it may be justifiable to ampu-

tate the diseased cervix and trust that the pregnancy will not be disturbed, as happened in one of Everke's cases.

Literature Concerning Cancer of the Cervix Complicating Pregnancy and Labor.

Cullingsworth: Cesarian section; child saved, mother lost; Lancet, 1893, ii. 1382.
Sutugin: Two cases of Cesarian section for cancer of the uterus; Index Medicus, 1890.
Flöel: Carcinoma of Cervix; placenta prævia, weak pains, Centr. f. Gyn., 1891, xv., 657.
Bagdanik: Cancer of Cervix and Vagina; Cesarian section; Centr. f. Gyn., 1892, xvi. 97.
Porak: Cesarian section for Cancer of the Cervix; N. Arch. d'obst. et de Gyn.
Duncan: Epithelioma of the Cervix; Cesarian section; Middlesex Hosp. Rep., 1892, 159.
Lewis: Cancer of Cervix; division of anterior lip; forceps; dead child; later vaginal hysterectomy. The Post Graduate, June, 1893.
Tarnier: Cancer of Cervix, etc.; Cesarian section; Journ. de Sages Femmes, 1893, xxi. 377.
Herzfeld: Carcinomatous degenerated fibroid of the cervix; Allg. Wien. ztg., 1892, xxxvii. 312.
Donald: Cesarian section for Cancer; Lancet, 1893, ii. 510.
Everke: Amputation of Carcinomatous cervix during pregnancy; Centr. f. Gyn., xxiv. 589.

Displacements of the Uterus may interrupt pregnancy or obstruct delivery. The normal anteflexion of pregnancy may be absent and retroflexion present. This may cause congestion, metritis and abortion. When the retroflexed uterus becomes incarcerated, it may be necessary, in the interests of the mother, to induce abortion. Prolapsus of the uterus may come on quite suddenly, and, if not replaced, may lead to uterine congestion, hemorrhage, and abortion. Lawrence recently reports a case of prolapsus of the pregnant uterus with the extra-abdominal delivery at term of a living child (Br. M. Journ., 1892, i. 859). Chaleix reports a case of dystocia in a woman who had undergone the operation of shortening of the round ligaments. (Gaz. hebd. de sc. m. de Bordeaux, 1892, xiii. 430.)

Abnormal developments of the Uterus may imperil the child's life during child-birth. Thus, double uterus may cause tedious labor from imperfect muscular development of the pregnant horn, its deviation from the normal axis, and possible obstruction from the unimpregnated horn. V. Dittel recently reports a case of labor in a double uterus and vagina terminating favorably for mother and child. He

refers to a case of Israel in which a woman with such a uterus gave birth to eight children. Layton, however, reports a case of difficult labor with a double uterus. In a case of Burke's the fetus was in one horn and the placenta in the other. In Bordé's case the fetus presented by the breech and was born dead. In a case of malformed uterus and vagina, Ashton did a Porro-Mueller operation in twenty-one minutes, saving mother and child. Gardner reports two cases of transverse presentation in uterus bicornis.

Literature Concerning Abnormal Development of the Uterus.

V. Dittel, Jr.: Labor in a Case of Double Uterus and Vagina; Centr. f. Gyn., 1894, xxv. 610.

Burke: Bifid Uterus; Br. M. J., 1892, 1, 1020.

Layton: Dystocia from bifid Uterus; N. Orleans M. & S. J., 1891–2, xix, 412.

Borde: Bi-lobed and Heart-shaped Uterus, Bul. d. Sc. med. di Bologa, 1892, iii. 206.

Gardner: Uterus Bicornis; Maryland Med. J., 1892, xxvii. 573.

Ashton: Malformation of Uterus and Vagina; Med. News, 1891, lviii. 369.

CHAPTER X.

MATERNAL CAUSES DURING LABOR—(Continued.)

Placenta Previa.—As nearly two-thirds of the children are born dead and more than one-half of those born alive die within the first few days of life, the grave importance of this complication at once becomes apparent. Most of the children are lost before full term is reached and at full term 58 per cent. die. Thus, in the combined statistics of Simpson, Depaul and Mueller—embracing 1022 cases—59 per cent. of the children were lost (Charpentier). The frequency of mal-presentations has been noted by Simpson, Mueller and others. Individual cases have recently been reported by Christian, Nott and Proben. Out of 1238 cases of placenta previa collected by Simpson and Mueller, 239 presented transversely (Charpentier). That this in itself materially adds to the danger of the child's death can readily be understood. Asphyxia from the loss of maternal blood, and imperfect respiration from partial attachment of the placenta, easily explain the intra-uterine death of the child in most cases.

If left to nature the fetal mortality is least—32 per cent. In cases of artificial delivery the mortality reaches 57.3 per cent. (Charpentier.) Lomer in sixty-five cases reported twenty-three children saved. In spontaneous delivery he places the mortality at 57 per cent.; after version, 73 per cent.; after forceps, 66 per cent. Sickel reported 416 cases of version with a fetal mortality of 60 per cent. Mueller reported ninety-two cases of accouchement forcé followed by version, with a fetal mortality of 62.7 per cent. The same writer reported thirty-four cases treated first by tampon, or colpeurynter, with a fetal mortality of 50 per cent.

From these rather conflicting figures we can deduce this one important fact: that inaction, as well as over-action, are serious to both mother and child. Leaving the case exclusively to nature may mean death to both. In this, as in all complications of labor, we must choose that mode of treatment which, while chiefly protecting the

interests of the mother, will also best subserve the interests of the child. From this point of view we must at once reject exclusive expectancy as dangerous to both. The forcible separation of the placenta by Barnes' method is so very serious to the child—67 to 100 per cent., mortality—without any compensating advantages to the mother, that it must also be rejected. The use of ergot, as pointed out elsewhere, is likewise almost so regularly fatal for the child that we reject its use without apology. Accouchement forcé with version or forceps, likewise offers great risks for the child. What plan shall we then pursue?

If the child has reached a viable age and the parents are able to devote themselves to the exacting care of a premature child, one of the best plans to pursue is to tampon the cervix and vagina at the first evidence of decided hemorrhage. This will usually induce labor and check further hemorrhage. The smaller size of the child will render its being born alive more probable, while the risks to the mother will be simultaneously reduced. Thomas saved ten out of eleven women and six children, by resorting to this plan (Grandin). At full term the writer would again advise resort to the tampon. In fifteen cases reported by King, in which the tampon played the principal rôle, thirteen mothers and nine children were saved (Harris). Tomer refers to 178 cases treated by tampon, and followed by version or spontaneous delivery, with a fetal mortality of 60 per cent. and a maternal mortality of only 4.5 per cent. (Charpentier.)

The writer believes the following method to be the most rational, and accompanied with the least danger to mother and child. The hemorrhage having shown itself at a time when the child is known to be viable, the patient is placed on a table, the genitals disinfected, and the speculum introduced. The cervix is now seized with volsellum forceps, and the os packed with a strip of iodoform gauze, supported by a vaginal plug of the same material. In the course of ten or fifteen hours the cervix will usually be found somewhat dilated, and labor pains started. After cleansing the parts with a hot, antiseptic douche, the packing is repeated. After sufficient dilatation, if bleeding assumes a threatening aspect, delivery should be completed by the method of accouchement forcé, under anesthesia. The fingers in the cervix are rotated and gradually increased in number, until the entire fist readily enters the os. Now a bi-manual or podalic version should

be performed. If the cervix is sufficiently soft and dilated the child may be at once extracted. As a rule, however, it will be better to bring down a foot and wait, allowing the thigh and buttocks of the child to gradually complete the dilatation. This will likewise usually control bleeding. The anesthetic being stopped, the expulsion of the rest of the child's body may be left to labor-pains, or, in case of haste, rapidly extracted. The writer has resorted to this plan in a number of cases, with almost uniformly successful results to both mother and child.

Literature Concerning Placenta Previa and Accouchement Force.

Murray: Three Cases of Placenta Previa Causing Abortion; Tr. Am. Gyn. Soc. 1890, xv. 360.

Christian: Malpresentations in Placenta Previa; Ann. Gyn. & Ped., 1890-1, iv. 536.

Nott: Placenta Previa; Atlanta Med. and Surg. J., 1890, vii. 672.

Proben: Transverse Presentation in Placenta Previa; Med. Rec., 1891, xxxix. 81.

Loviot: Placenta Previa; Podalic Version; Death of Fetus; Bull. et Mém. Soc., Obst. et Gyn. de Paris, 1892, 188.

Segueira: Placenta Previa; Version; Br. Med. Journ., 1893, 519.

Rueder: Twelve Cases of Placenta Previa; Münch. Med. Woch., 1893, xl. 619.

Eliot: Accouchement Forcé; Journ. of Am. Med. Ass., 1893, xxi. 342.

Grandin: Accouchement Forcé; Tr. Am. Gyn. Soc. 1892, xvii. 166.

Marx: Accouchement Forcé: Med. Rec., 1894 (Feb. 17), 202.

CHAPTER XI.

MATERNAL CAUSES DURING LABOR—(Continued.)

Fibroid Tumors of the Uterus constitute one of the most serious forms of new growth which complicate labor from the fetal as well as the maternal standpoint. In about every three cases pregnancy will be interrupted in two. Chabazian (Charpentier) collected 114 cases with the following histories: fifty went to term with ten very difficult labors; eighteen terminated prematurely; sixteen had hemorrhages during pregnancy or later; five suffered rupture of the uterus; five had prolapsus of parts during labor; five showed flattening of the fetus, and in three there was retention of the fetus. From this we can see that the risks to the child are many and serious. Previous to labor the child may be lost through premature birth, or abortion and hemorrhage. During labor the death of the child may be due to obstacles to birth, rupture of the uterus, malpresentations, and malformations. In some cases the tumor is expelled with the child. The writer has had one case in which the tumor—the size of a plum—was evidently broken off during delivery with forceps, but not recognized at the time. On the third day it was spontaneously discharged.

Malpresentations in these cases are so frequent as to deserve a special notice. In three hundred and twenty-six cases referred to by Charpentier and collected from various sources we find ninety-three presenting by the breech and fifty-seven by the shoulder or trunk. The breech presentations, in cases complicated by large tumors, are not favorable for the child.

The infantile mortality in cases of labor complicated by fibroid tumors is very considerable. Susserott, in one hundred and forty-seven cases, places the fetal mortality at sixty-six per cent.; Nauss in two hundred and eighty-seven cases places the mortality at 57.2 per cent. (Charpentier.)

In the treatment of labor in these cases we are again required to consult the welfare of the mother besides that of the child. Authorities differ in regard to the method to be pursued. Of thirty-two cases treated on the expectant plan, Chabazian found that nine mothers

died, twenty-one recovered and two were not noted. Of the children fourteen died, seven survived, and eleven were not noted. In eight extirpations of the growth during pregnancy one mother and three children were lost. In twelve extirpations during labor one mother and five children were lost (two not noted). In five forceps cases, all excepting two children (not noted) recovered. In three versions one mother and one child were lost (one child not noted). In two cases of manual extraction one mother was lost. In a case in which the blunt hook was used both mother and child were lost. These interesting figures are quoted by Charpentier. It is interesting to note that in five embryotomies three mothers and all of the children were lost, and that of six Cesarian sections five mothers and three infants were lost (one not noted). It is needless to add that these last statistics refer to older cases.

Artificial interference is necessary in sixty per cent. of the cases before labor can be terminated. When accessible the growths should be removed. Charpentier rejects induction of labor or Porro's operation. He advises waiting for spontaneous labor, and then, if necessary, resorting to reduction of the size of the fetus or to enucleation of the tumor. Some authorities (Tarnier) advise version, others (Depaul) the forceps. In forty-six forceps-cases (Susserott and Lefour) thirty-one mothers and twenty children were saved. In twenty versions (Susserott) only eight mothers and three children were saved. Therefore, if statistics are worth anything, these figures clearly indicate that in the interests of both mother and child, forceps deserve the preference in appropriate cases.

The results of abdominal section in fibroid tumors referred to by Charpentier have been bad. Of twenty-eight Cesarian sections only four mothers and fifteen children were saved. Of five hysterectomies all the mothers were lost. But these are old statistics and count for little in the present state of abdominal surgery. Within the past three years the writer was able to collect no less than seventeen cases of fibroid tumor complicating pregnancy or labor. Many of these were subjected to abdominal section and quite a number recovered. In four cases the growth was successfully removed during pregnancy. In two cases the tumor did not interrupt pregnancy; but in two others the patients aborted. In one case complicated by placenta previa the fetus was born dead and there was spontaneous displacement of the tumor. Under chloroform a pediculated fibroid was reduced in one

case and followed by craniotomy. Five versions were done, two of the mothers and all of the children being lost. No less than four successful Porro-operations have been done in this time in this class of cases.

The inferences regarding treatment are plain. Small intrapelvic fibroid tumors should be left to nature unless the patient's exhausted condition necessitates interference. If the tumor is pediculated and can readily be reached per vaginam, an attempt may be made to remove it previous to delivery. If the tumor is large and can be reduced, this should be done and forceps applied. Under no circumstances ought version be done, as the mortality of mother and child after this operation is greatest. When the tumor is irreducible, a study of statistics shows that only one course is available, and that is a resort to abdominal section. This offers the very best chance for the child, and in the hands of competent operators, a fair chance for the mother. The modern Porro-operation has been done sufficiently often in these cases, in recent years, to require no apology for its performance. The results will be most favorable when the operation is done under good surroundings and before the condition of the woman has become too much exhausted to withstand the necessary shock.

Literature Concerning Fibroid Tumors of the Uterus Complicating Pregnancy and Labor.

Everke: Two Cases of Myomectomy on the Pregnant Uterus; Central. f. Gyn., 1894, xxiv.

Wurkert: Myomectomy on Pregnant Uterus; Centr. f. Gyn., 1894, xiii. 320.

Stratz: Removal of Fibroid Tumor; Delivery of Living Child Later; Berlin Klin. Woch., 1893, 112.

Blanc: Dystocia from Fibroid; Spontaneous Displacement; Placenta Previa; Death of Fetus; Paris, 1891, G. Steinheil, 8°, 8.

Kufferath: Pediculated Fibroid; craniotomy; Clin. Brux., 1893, viii. 625.

Liebholz: Fibroid; Version; Berl. Klin. Woch., 1892, xli. 1039.

Hueter: Submucous Myoma; Version; Berl. Klin. Woch., vi. 112.

Hollister: Submucous Fibroid Complicating Labor; N. Y. Med. Journ., 1892, 383.

Ryan: Uterine Fibroid and Placenta Previa; Br. Med. J., 1893, i. 65.

Crofford: Fibroid Tumor Complicating Pregnancy; Trans. Miss. Ass., 1893, xxvi. 91.

Price: Fibroid Necessitating Porro's Operation; Trans. Col. Phys., Phil., 1891.

Robson: Successful Porro's Operation for Myoma; Lancet, 1893, i. 414.

Dunn: Fibroid Complicating Pregnancy; Northwest Lancet, 1892, xii. 31.

Sutugin: Pregnancy and Labor Complicated by Fibro-myoma; Index Medicus, 1892.

Sampelago: Enormous Fibrous Polypus Causing Dystocia; Index Medicus, 1892.

Herzfeld: Carcinomatous Degenerated Fibroid Causing Dystocia; Allg. Wien. Med. Ztg., 1892, xxxvii. 312.

CHAPTER XII.

MATERNAL CAUSES DURING LABOR—(CONTINUED.)

Ovarian Tumors and Cysts of the Broad Ligament may seriously complicate pregnancy and jeopardize the life of the child during birth. The frequency with which these tumors are met with can be readily understood from the fact that Gordon has been able to collect no less than two hundred and four cases during the pregnant state. From 1891 to 1894 the writer has met no less than twenty cases reported.

In spontaneous deliveries the risks to the child are grave. In twenty-three cases Litzmann and Playfair found that fourteen children and eleven mothers were lost. In ninety-seven cases collected by Doumaison and Litzman forty-nine mothers were lost, and, in the former's forty-one cases, only seventeen children survived (Charpentier).

If the growth is discovered during pregnancy statistics show that the best treatment consists in operation. Stratz refers to eighty-four ovariotomies performed during pregnancy with a maternal mortality of only 9.5 per cent.; and Heiberg to forty-six cases with a maternal mortality of 15 per cent. and a fetal mortality of 50 per cent. (Charpentier.) The latest statistics in this regard are those of Gordon, who collected 176 cases. In these the maternal mortality was only 6.8 per cent.; 122 of the women carried to term; 49 aborted; and 5 died undelivered. In 5 of Gordon's cases operated on during pregnancy, all the mothers recovered, 3 aborted, and 2 went on to term. In intra-ligamentous cysts the pregnancy is, as a rule, disturbed.

What course is to be pursued if the tumor is only discovered at term or during labor? In Litzmann's collection of fifty-six deliveries only thirty-two mothers and nine children were saved (Charpentier). The tumor was punctured in nine cases, and all of the mothers and children were saved. Some writers advise reducing the tumor, and then resorting to forceps, version, or craniotomy. In this country Reynolds advises taxis by upward pressure through the vagina and rectum under ether in the knee-chest position. If this fails he advises Cesarian section with removal of the tumor; or, if the exhaustion is

too intense, he recommends aspiration per vaginam or vaginal ovariotomy. Lomer advises against prolonged delay. He would first try to reduce the tumor. If unsuccessful he would puncture it or fully incise the cyst-wall. In solid ovarian tumors he advises Cesarian section or perforation of the child (Charpentier).

During pregnancy American authorities are unanimously in favor of resorting to ovariotomy. Nearly 70 per cent. of Gordon's uncomplicated cases went on to term. During labor, in view of the recent favorable statistics of Cesarian section, the writer is convinced that, if the tumor is irreducible and the general condition of the patient fair, the best chances for mother and child lie in this operation. If the maternal condition is unfavorable, resort to reduction of the tumor or puncture must be chosen. In one of Reynolds' cases the cyst was ruptured in an attempt to push it up; the child was then turned and extracted, but died several hours later. In another case version was done after reducing the tumor, but the child was still-born. Flaischlen succeeded in delivering a living child with forceps after replacing a large dermoid tumor.

Literature Concerning Ovarian Tumors, Etc., Complicating Pregnancy and Labor.

Meredith: Two Cases of Ovariotomy in which Pregnancy was not Disturbed; Centr. f. Gyn., 1895, xxiv.

Loisin: Dystocia from Dermoid Cysts of the Ovary; Arch. de Tocol. et de Gynec., 1891, xviii. 688.

Flaischlen: Two Cases Complicating Pregnancy and Labor; Zsch. f. Gebts. u. Gyn., 1893, xxv. 239.

Griffith: Fibroma of the Ovary; Trans. Obst. Soc., London, xxiii. 140.

Riedinger: Interpartum Prolapsed Tumor of the Ovary; Prag. Med. Woch., 1891, xvi. 186.

Reynolds: Two Cases of Ovarian Cysts Obstructing Labor; Boston Med. and Surg. J., cxxvi. 133.

King: Labor Obstructed by Ovarian Tumor; Trans. Am. Gyn. Soc., 1893, xviii. 215.

Fischer: Dermoid Cyst of the Ovary Causing Dystocia; Prag. Med. Woch., 1893, xviii. 285.

Gordon: Five Ovariotomies During Pregnancy; Centr. f. Gyn.; 1894, xxiii. 566.

Gener: Child Delivered after Version; Ovariotomy Three Weeks Later; Centr. f. Gyn., 1894, xvi.

Everke: Two Ovariotomies During Pregnancy; Centr. f. Gyn., 1894, xxiv.

Dewar: Dermoid Cyst Delaying Delivery; Lancet, 1894, i. 19.

Chiarlioni: Dystocia from Dermoid Cyst; Boll. d. Clin., 1891, viii. 289.

Tisai: Rupture of Dermoid Cyst; Peritonitis; Death Five Days following Labor; Rev. Obst. et Gynec., 1892, viii. 151.

CHAPTER XIII.

MATERNAL CAUSES DURING LABOR—(CONTINUED.)

3. DYSTOCIA DUE TO THE BONY PARTS.

Pelvic tumors may cause dystocia and cost the child its life during the process of birth. They may occur as exostoses, osteosarcoma, malignant growths, spiculæ of bone, or callus after old fractures of the pelvic bones. According to Harris pelvic exostoses have been the cause of obstacles to delivery in eight American Cesarian sections. Five of the children were delivered alive, and four of the women recovered. Herman did a Cesarian section in a case of pelvic osteosarcoma, saving the child, but losing the mother (Lancet, 1891, i., 986). Although obstruction to labor from this cause is rare, the consensus of modern opinion is that the best chances for the child as well as the mother lie in the timely performance of Cesarian section.

Deformities of the Pelvis.—Besides excess and diminution in size, some authors describe no less than fourteen or fifteen deformities of the pelvis which contract its lumen and threaten to destroy the life of the child in its attempt to emerge into the world. It is not within the limits of this essay to even attempt a description of these various deformities. We shall only attend to them in their order of importance, and only in so far as they jeopardize the life of the child.

In this country we frequently meet with the generally contracted pelvis, and less so with the rachitic pelvis and those depending on spinal or hip disease or on pelvic tumors. The writer has met at least twenty cases of markedly contracted pelvis in his private practice, and many more of the lesser grades in the City of New York during a period of eight or nine years. Most of these were successfully delivered by forceps or version, but many of the children were lost. Two children became impacted and required perforation. In one case the attending physician performed version and amputated at

the neck; the woman died with the child's head undelivered. In another case the child was lost after a difficult version, and the mother herself died of shock several hours later. With such a lamentable showing, which we believe reflects the experience of most physicians in private practice, is it any wonder that, with increasing years, we look forward to the time when the mass of practitioners will have acquired the proper degree of enlightenment, and, following the dictates of the leaders in the profession, will save the lives of hundreds of unborn children, and, perhaps, mothers now doomed to death? A recent writer lamenting the frequency with which perforation is resorted to, remarks: "If the time comes when the risk to the mother can be proved to be no greater by timely resort to operation, which also considers the life of the fetus, most assuredly will it be our duty to reject absolutely all mutilating operations in case of a living child, other conditions necessary for the successful section or laparo-elytrotomy being present." (Grandin.)

Different writers place the occurrence of pelvic deformities at 72 to 145 in every 1000 cases. In 10,557 labors Scanzoni found 198 with pelvic contractions, and of these only 65 per cent. of the infants were saved. In 47.4 per cent. of the cases, delivery was spontaneous with fetal mortality of 19.1 per cent. (evidently the lesser grades of contraction). Where instruments for the premature induction of labor were required 61 per cent. of the children were lost. With forceps 32.4 per cent., and after version, 69 per cent. of the children succumbed. Perforation was resorted to 19 times. In 13 cases of generally contracted pelvis observed by Lubae, only 3 infants were saved. The maternal mortality is twice as great as in normal pelves, and that of children is 35 per cent. (Spiegelberg.)

Malpositions are frequent in deformed pelves. In 829 cases collected by Rigaud and Stanesco, 131 were other than vertex, and in 90 there was prolapsus of the cord or limb (Charpentier). Spiegelberg asserts that prolapsus of cord or limb occurs four or five times more frequently than in normal pelves. Presentations of face or shoulders occur also much more frequently.

The dangers to the child arise from prolongation of the labor, premature rupture of the membranes, and prolapsus of cord or limbs. The increased work put on the uterus interferes with the fetal circulation and occasionally causes the premature separation of the placenta

with intra-uterine fetal asphyxia. Besides this, even in vertex cases, we may get excessive caput succedaneum, superficial or deep impressions of the skull, deep overlapping of the sutures, and even, at times, fractures. The researches of Pajot, Michaelis, and Olshausen show various lesions: 1, to the face and head of the child—such as wounds, hemorrhages (extra- and intra-cranial), depression of bones, compression of brain, fractures, and contusions; 2, to the neck—such lesions as rupture of the vertebral column and tearing off the head; 3, to the body—rupture of the vertebræ, contusions of the abdominal viscera, rupture of the cord and lesions of scrotum; 4, to the limbs—fractures, dislocations, separation of the epiphyses and paralyses. Could there be anything more appalling than this list of injuries which a child is subject to in these cases?

The prognosis has been partly considered in a preceding paragraph. The infant mortality is due in great measure to the large proportion of still-births, consequent upon the protraction of labor and the continuous pressure to which the child is subjected. Even in slight degrees of contraction one out of five children is still-born (Playfair), and as the deformity increases, the prognosis becomes worse. Prolapse of the cord occurred 59 times in 414 labors (Stanesco). When the contraction is sufficient to indent the head of the child, 50 per cent. die during or shortly after labor (Schroeder). Frequent malpresentations cause the death of a large number of children in these cases. In seventy-seven cases of spontaneous labor in contracted pelvis—collected by Dohrn, Kummer and Berthold, and Milne—sixty-six of the children were lost. This contrasts strongly with the 407 cases collected by Lusk from various sources with a loss of only fifty-three children, and can only be explained by presuming the latter's cases as having been of the milder type only. According to Charpentier the contractions due to rachitis are the most frequent and give the least unfavorable results; the osteomalacic and funnel-shaped give the worst. In American women, however, the rachitic pelvis is seldom met with. In eight cases of double oblique pelvis, Chantreuil and Choisil noted six dead children. In eleven cases of contraction of the transverse diameter of the brim, seven children were lost. In the Naegele oblique pelvis Litzmann reports the death of thirty-one children out of forty-one cases.

The diagnosis of contracted pelvis deserves some attention. If

there is anything more neglected by the average practitioner than a careful study of the fetal heart preceding and during labor, it is an exact knowledge of the measurements of the pelvis. The description of numerous complex instruments in most text-books may account for this state of affairs. But there can be no question that the life of the unborn child and, to a great extent, that of the mother, depends on the knowledge which the attending accoucheur has in regard to the size of the bony pelvis. The writer has never carried any special apparatus with him and has always been able to form a fair estimate of the size of any pelvis. With two fingers in the vagina—the tip of the middle finger touching the promontory of the sacrum—the point is marked with the index-nail of the other hand at that part of the examining finger just beneath the symphysis pubis. Deducting three-quarters of an inch gives a fairly accurate idea of the measurement of the true conjugate, which is, by far, the most important of all the measurements. The true conjugate in a normal pelvis measures 4 to 4¼ inches. As a tape-measure is present in almost every well-regulated house, or can be easily obtained, there is no special difficulty met with so far. For the external measurements the extremities of two long pieces of stiff wire—with a curve resembling that of a carpenter's compass, or, if not at hand, the two blades of ordinary long forceps may be used—are made to touch the various pelvic landmarks. Thus the distance between the two anterior iliac spines would normally measure ten inches. The distance between the centre of the crests of the ilium would measure normally eleven inches. The distance from the symphysis in front to the sacrum behind ought to be about seven and three-quarter inches.

There can be no question but that pelvimetry has been too much neglected with us. Forceps and version have repeatedly been resorted to with resulting death to the child and often to the mother, where a little care in examination in the beginning might easily have shown that they were never indicated. Many a child, and often the mother, too, could have been saved by careful pelvimetry with the resulting decision to elect symphyseotomy or the Cesarian section long before futile efforts at delivery had so jeopardized the life of both mother and child as to make the operations a hundred-fold more hazardous. The elective Cesarian section is the only operation of the future in cases of excessive contraction, and the operation of symphy-

seotomy is the one for lesser degrees. Perforation and craniotomy of the living child will have little place in the practice of the best obstetricians and in the text-books of the near future.

Literature Concerning Diagnosis, Prognosis, Etc., of Contracted Pelvis.

Text-Books on Obstetrics of Lusk, Playfair, Schroeder, Spiegelberg, and Charpentier.
Dohrn: Contracted Pelvis; Arch. f. Gyn., xxi. 70.
Kummer and Berthold: Contracted Pelvis; Archiv. f. Gyn., vi.
Milne: Contracted Pelvis; Edinb. Med. Journ., xix.
Litzmann: Naegele Oblique Pelvis; Monatseh. f. Gebtsh., xxiii. 268.

CHAPTER XIV.

MATERNAL CAUSES DURING LABOR—(Continued.)

TREATMENT IN CONTRACTED PELVIS.

Expectant treatment offers good prospects for both mother and child, provided the accoucheur has convinced himself that the contraction is slight, and the labor-pains good. The hasty resort to forceps has cost many a child its life. In cases with a conjugate measuring $3\frac{1}{2}$ inches or more there is no necessity to terminate the labor by interference, so long as the child's heart sounds are good and the labor-pains strong. As Lusk remarks, nature will do the best work with the least expense of infant life and with relatively small maternal mortality. Still Charpentier advises premature induction of labor at $8\frac{1}{2}$ months in these cases. If interference becomes necessary and the head is fixed in the pelvis, it is best to use forceps. If the head is movable above the brim, delivery will be more readily effected and with better prospects for the child by version. This latter operation is also indicated in brow, face and shoulder presentations and in cases of eclampsia and prolapsus of the umbilical cord.

Premature Induction of Labor.—At 7 to 8 months the fetal biparietal diameter measures $3\frac{1}{4}$ inches; at 8 to 9 months, $3\frac{1}{2}$ inches. Hence when the conjugate measures 3 to $3\frac{1}{2}$ inches, the indication from the maternal standpoint would be to induce labor between the 7th and 8th months, or the 32nd to the 34th week (Lusk). While the risks to the mother from this procedure are not serious, if properly done, those to the child are enormous. In this country, particularly, has little attention been given in private practice to the supervision of the prematurely-born infant, and the mortality has consequently been enormous. Litzmann concluded that, even when indicated in the interests of the mother, it offered dubious advantages to the child, and places the fetal mortality at 55.8 per cent. Dohrn reported 15 living children in 25 cases. Kunne induced labor 15 times, saving 12 of the children (Charpentier). Spiegelberg says that

induced labors means a fetal mortality of 66.6 per cent. Hence, from the standpoint of the child, this operation can only be justifiable provided the necessary care and attention can be guaranteed later.

The idea very prevalent among the laity that eight-months' children cannot live is radically false and has been disproved by a large number of observations. Children which weighed less than $3\frac{1}{2}$ pounds have been successfully raised. According to Tarnier 30 per cent. of children weighing only 1,000 to 1,500 grammes (2 to $3\frac{1}{8}$ pounds) can be raised. (Results furnished by the daily weight of children at the breast; Laure, Paris, 1889, 53.) The obstetrician, therefore, who fails to conscientiously devote himself to resorting to every effort which may result in the preservation of the life of the immature infant is guilty of professional neglect. In New York City during the past year an immature child said to have weighed a trifle less than two pounds was successfully reared, after a four-months' residence in an incubator, to the age of seven or eight months, when it finally succumbed.

Besides contracted pelvis, the indications for induction of premature labor may arise from diseases which imperil the life of the mother, as uncontrollable vomiting, enormous abdominal distension from various causes, placenta previa, etc., or in cases in which the child habitually dies previous to the time of labor.

In the induction of premature labor in contracted pelvis—as hinted at in the beginning—the prognosis for the child is not good. In 219 cases referred to by Charpentier, only 73 children were born alive, and 148 were either born dead or died shortly after birth. In Litzmann's table of 34 induced labors, in cases of contracted pelvis, 55.8 per cent. of the children were lost, whereas, in 118 cases of premature spontaneous labor only 7.6 per cent. were lost. This brings strikingly to the front the contrast in the living chances of an immature child after spontaneous and artificial premature delivery. Where the pelvis measured antero-posteriorly 2 to $3\frac{1}{2}$ inches, Rigaud and Stanesco, in fifty-three cases, found that thirty-four of the children were lost after premature induction of labor. In pelves measuring less than 2.3 inches premature labor has always been fatal to the infant.

We can therefore conclude that, under all circumstances, the induction of premature labor offers considerable risks for the child, but

that it offers the best chances the nearer to term it is performed and the larger the pelvis. This means that the less active the intervention and the greater the development of the child, the better the chances for its life.

Without entering into a detailed description of the various methods of inducing labor, we shall content ourselves with stating that at present two methods are chiefly in vogue—that of Krause, by the use of the catheter, and that of Pelzer, by the use of intra-uterine glycerin injections. Although twenty-eight times successful in the hands of Pelzer, Gener, Edgar, and others, the use of glycerin injections has recently given rise to dangerous maternal symptoms in the hands of Pfannenstiel and Embden. With regard to the catheter it may be said that Charpentier resorted to its use twelve times without a failure. Therefore the method per catheter should continue as the preferable of the two. The writer has succeeded in one case in inducing labor by packing the cervix with iodoform gauze. This is perfectly easy of performance, requires no anesthetics or assistants, and is accompanied with no danger at all. In cases of no great urgency it deserves a trial.

The care of the prematurely born child deserves a notice in this work. If born asphyxiated, external irritants should be first tried. If these fail, a catheter should be passed into the larnyx, or the Sylvester method of artificial respiration resorted to. These efforts at resuscitation must be renewed from time to time for the first few hours or days. Two or three times daily these children must be bathed, and if the cry is feeble, thoroughly rubbed. The child must be awakened every hour or two and fed at the breast or with the spoon.

Directly after birth the air of the room should be kept at a higher temperature, the baby packed in cotton, and the crib surrounded with hot water in bottles. The Germans use a warm-bath apparatus, which can readily be imitated by placing the child in its wrappings in a small bath-tub, and placing this in an outer, larger bath-tub containing hot water, which is changed every three or four hours. One thermometer next to the baby and one in the water will keep the nurse properly informed of the temperature surrounding the child.

Numerous apparatus have been invented, in the shape of incubators, such as the Couveuse of Tarnier, or Baths of Winckel or Credé, which are very ingenious and useful, but unfortunately very difficult

to have at hand in private practice, when wanted. The methods of wrapping the child in cotton or in a pillow and surrounding it with hot water-bottles, or placing it in the double bath-tub arrangement, are so simple in execution that there can be no excuse for their omission. The use of artificial warmth to the premature infant has very much increased the favorable prognosis. The work necessary is considerable, and it is hard often to get the laity to assist, but it is essential for the profession to be concerted in this direction.

The feeding of these children is likewise apt to be troublesome—usually the method of pouring a little mother's milk or diluted cow's milk from the teaspoon will be sufficient, but it must be done at regular intervals of every hour or an hour and a half. Some have advised introducing the milk through the nose, and Tarnier speaks highly of the use of "gavage," by which the milk is introduced directly into the stomach through a soft rubber catheter.

Literature Concerning Premature Labor and Premature Children.

Berthold: Couveuse and Gavage at the Paris Maternity; Paris, 1887.
Tarnier: Premature Children; Ann. de Gyn., 1885, xxiv. 130.
Winckel: Premature Induction of Labor; Lehrb. f. Gebtsh., 1889, 889.
Lusk: Text-book on Obstetrics, 342.
Crede: Premature Infants; Arch. f. Gyn., xxiv. 1884, 128.
Buschbeck: Induction of Labor; Arb. a. d. k. Frauenklinik in Dresden, Leipzig, 1893, i. 93.
Playfair: Text-book on Obstetrics, 443.
Charpentier: Text-book on Obstetrics (Grandin), 177.
Pelzer: Induction of Premature Labor with Glycerine; Central. f. Gyn., 1894, xxii. 634.
Pfannenstiel: Dangers of Glycerine Injections; Central. f. Gyn., 1894, iv.
Embden: Dangers of Glycerine Injections; N. Y. Med. Rec., July 28th, 1894, 105.
Gener: Glycerine to Induce Labor; Cent. f. Gyn., 1894, xxvii., 636.

CHAPTER XV.

MATERNAL CAUSES DURING LABOR—(Continued.)

Forceps.—After their invention there was a time when these instruments were not used oftener than once in 21,867 labors, whereas craniotomy was performed three or four times as frequently as forceps delivery (Playfair). There is nothing in the practice of obstetrics which so tests the skill and judgment of the accoucheur as the use of forceps in contracted pelvis. The skill can readily be acquired by every practitioner. It is the judgment required regarding the proper cases in which to apply forceps which is apt to assume one of two extremes. The too hasty resort to this instrument may result in the death of the child from unexpected difficulties. Besides this the instrument itself, even in the best hands, is associated with undeniable risks. With the knowledge also that spontaneous labor, if not too long delayed, is apt to give the best results for the child in moderate degrees of contracted pelvis, the careful practitioner, watching the fetal heart-beat and character of the pains, will postpone the use of forceps in the hope of a natural birth. The opposite extreme is, however, often as dangerous, for many an infant is lost from timidity and procrastination. He who can exercise "the happy medium" will be blessed with the least infantile mortality.

The dangers to the child after forceps are considerable. Direct injuries frequently occur, such as lacerations of the integument of the scalp and forehead, contusions of the face, facial paralysis, depression or fracture of the cranial bones; or undue pressure of the blades may injure the brain (Hicks and Phillips). Jacobi refers many cases of meningitis and meningo-encephalitis to the use of forceps. The danger to the infant depends on the amount of force used and on its persistency or irregularity. Within the cranium the vessels of the brain or the venous sinuses may be torn (Webster). V. Prenschen met a case of fracture of the roof of the orbit after forceps (Gärtner). In 102 uncomplicated forceps cases Poppel found 61 living children; 36 were delivered asphyxiated, and of these 30 were saved. Sickel col-

lected 6228 forceps deliveries, of which 1069 children were lost. Murphy found that 50 children were lost in 248 forceps cases. Harper found the infantile mortality to vary between one in 26 to 47 cases (Charpentier). In 36 cases Borinsky found that 14 children were lost.

The conditions requisite for the successful employment of forceps are a dilated or dilatable os, ruptured membranes, vertex engaged in the pelvic canal, and slight or moderate contraction of the bony pelvis. Besides this latter condition forceps may be indicated in cases of inertia uteri, resistent perineum, and occipito-posterior presentations of the vertex. When ordinary forces are insufficient to overcome slight obstacles to delivery, or when the interests of mother or child require speedy delivery, forceps are again indicated. It is well at times to employ Walcher's position by which the feet are allowed to hang down, increasing somewhat the antero-posterior diameter of the pelvis.

The application of high forceps is particularly accompanied with grave risks to the child. Williams collected one hundred and nineteen cases of high forceps with a maternal mortality of 10 per cent., and an infantile mortality of 60 per cent. Simpson asserts that one out of three children is lost in contracted pelvis after forceps. So that, Lusk justly observes, the use of forceps under such circumstances is to be regarded as hardly less dangerous than Cesarian section. When the head is movable above the brim forceps are particularly dangerous for the child, for, if the head becomes impacted, nothing is left but perforation and craniotomy. Braxton Hicks was obliged to resort to version after failing with forceps in four cases, and succeeded in saving three of the children. The writer, within the past year, met with two cases in which, forceps failing, version was substituted and both children were delivered alive.

Literature Concerning Forceps.

Williams: High Forceps; Am. Journ of Obst., 1879.

Gartner: Melæna, etc., after Forceps; Centrl. f. Gyn., 1894, xxix. 69.

Hicks & Phillips: Injuries to Child after Forceps; Obst. Trans. xiii.

Webster: Rupture of Longitudinal Sinus after Forceps; Centr. f. Gyn. 1894, xxxii. 784.

Fenwick: Forceps; Internat. Clinic, 1893, iii. 248.

Use and Abuse of Forceps; Charlotte, N. C. Med. Journ., 1893, iii. 17.

Neugebauer: Danger of Forceps etc.; Gaz. Leck. Warsaw, 1893, xiii 256.
Furth: On Forceps Operations; Centr. f. Gyn. 1893, xviii. 927.
Nagel: The use of Forceps; Internat. M. Mag, 1892, Ixi. 679.
Warren: Forceps; Trans. Maine M. Ass., 1892, xi. 168.
Fry: Forceps; Trans. Wash. Obst. and Gyn. Soc., 1889-90, iii. 79.
Swayne: Forceps During the last Fifty Years; Br. M. Chir. J., 1892, x. 153.
Kolberg: Indications and Prognosis of Forceps; Centr. f. Gyn., 1894, xlv. 1135.
Reynolds: Forceps; N. Y. Journ. Gyn. and Obst., 1892, ii. 907.
Porak: Danger of applying Forceps, etc.; Rev. Obst. et Gyn. 1893, ix. 119.
Tarnier: Forceps in Hip Disease; J. de Sages. Femmes, 1893, xxi. 281.
Swayne: Compression of the Umbilical Cord during Delivery by Forceps; Med. Rec., Aug. 11, 1894, 174.

CHAPTER XVI.

MATERNAL CAUSES DURING LABOR—(Continued.)

Version.—In this country, at least, version is preferred to forceps in moderate degrees of pelvic contraction, with the head movable above the brim. The reason for this lies in the observed fact (Cohnstein) that, after the birth of the shoulders, the head, beginning at the base of the cranium, can better mould itself to the pelvic canal and allow of easier extraction than when the vertex comes first. Lusk places the indications for version at a limit of $2\frac{3}{4}$ to $3\frac{1}{2}$ inches antero-posterior diameter of the pelvis, with sufficient amplitude in the transverse diameter.

The perils to the child after version are many. Fractures of the clavicles and humerus, lacerations of the sterno-cleido-mastoid muscle, rupture through the substance of the vertebræ, extravasations of blood into the cavities of the head and trunk, separation of the condyles from the occiput, and of the squamous portion of the temporal bone from the parietal bone, fractures and depressions of the skull, and rupture of the sinuses of the dura mater, are mentioned by various authors. The life of the child is chiefly endangered by premature respiratory efforts, and the depressing influence exercised upon the fetal heart by pressure at the base of the brain during efforts at extraction.

At the Dresden Clinic, in twenty-five successive versions with extraction in contracted pelves (conjugate measuring 2.8 to 3.2 inches) nearly 90 per cent. of the children were saved. Schatz has practiced version forty or fifty times in contracted pelves, and has usually obtained living children. In these cases the membranes were kept intact, the cervix was allowed to become fully dilated, and the patients were placed in Walcher's position with the extremities hanging down, thus increasing the length of the conjugate by a fraction of an inch. In forty cases of version reported by Korrman, Lœwenhardt, and Goodell, the fetal mortality did not exceed 22 per cent. The reports of other writers are, however, much less encouraging. In

fifty-eight cases of pure narrowing of the conjugate, reported by Borinski, one-half of the children were born dead. In Charpentier's thirty-six cases of contracted pelvis, with a conjugate ranging between $3\frac{1}{16}$ and $3\frac{1}{2}$ inches, no less than 73.3 per cent. of the children were lost. Cephalic versions show the least, podalic versions the highest infantile mortality.

The figures quoted, however, show the fallacy of collected statistics. So much really depends on the nature of the cases collected, the mode of operation, and the personal equation of the operator, that all such figures can only be regarded as having only a limited value.

Still, the decision between version and forceps will greatly depend on circumstances. The most recent authorities reject both in pelves measuring less than $3\frac{1}{2}$ or 3 inches. If the head is movable above the brim, forceps ought always to give place to version, as offering the better chance for the child. If the brow or face presents, if there is prolapsus of the cord, which happens in 60 per cent. of the cases, or if eclampsia is present, the interests of the child require a prompt resort to version.

The various methods by which version may be effected are chiefly four: external, cephalic, podalic and combined.

External version is the most ancient, having been resorted to by the Japanese and Mexicans. It is alluded to by Hippocrates and the Arabian physicians. Accordingto Pinard it ought to be practised in every case after the eighth month where the vertex is found to lie in one or other iliac fossa or in the upper uterine segment (Charpentier). Although this would be very desirable in all cases of breech, which are particularly serious in primiparæ, Charpentier points out that just in these cases external version is often impracticable. Next to transverse presentation, the indications for this procedure are offered by pelvic deformities discovered at term and abnormal insertion of the placenta. It is apt to be inapplicable in the pelvic presentations of primiparæ, in multiple pregnancy, and in the advanced stages of labor. Playfair limits external version exclusively to transverse presentations.

Internal cephalic version requires one hand in the vagina to seize and draw downward the head while the outer hand pushes the body upward (Busch); or the outer hand pushes the head downward while the hand in the vagina pushes the body upward (D'Outrepont). These manœuvres are not practicable during labor without anesthesia.

Podalic version was described as far back as the time of Celsus. The indications for its employment are transverse presentation, conditions dangerous to mother or child requiring rapid termination of labor, and pelvic deformity. A good rule is to use that hand the palmar surface of which conveniently corresponds to the anterior surface of the child's body. The foot being seized, the child's body is turned and extracted, or the part seized is allowed to act as a dilator of the cervical canal. The success of the operation depends on thorough dilatation of the cervix, mobility of the fetus, and fair size of the pelvis. A contraction of less than 2.7 inches in the conjugate is a strong contra-indication. Deutsch recommends a method by which the fetus undergoes a movement of rotation about its longitudinal axis and then the feet are disengaged. It is only practicable with much liquor amnii, a small fetus and a non-irritable uterus.

The bi-polar or combined method of Braxton-Hicks consists in passing two fingers in the vagina, lifting the presenting part, and assisting the rotation of the child with the other hand externally. It may replace cephalic or podalic version, but only as a rule at a time preceding the rupture of the membranes with the fetus still movable.

It may be of interest to add a table, from figures given by Charpentier, showing the comparative results to the child after spontaneous labor, version, forceps, and premature labor in cases of contracted pelvis.

TABLE OF INFANTILE MORTALITY IN CONTRACTED PELVIS AFTER

CONJUGATE.	1. Spontaneous Labor		2. Version.		3. Forceps.		4. Premature Labor.	
	Cases	*Infantile Mortality.*	*Cases*	*Infantile Mortality.*	*Cases*	*Infantile Mortality.*	*Cases*	*Infantile Mortality.*
3½ or more inches.	216	15.74%	21	66.6%	51	54.9%		
3½ to $3\frac{1}{10}$ "	84	36.9%	15	80.0%	60	31.66%	17	47.0%
$3\frac{1}{10}$ to $2\frac{7}{10}$ "	11	45.45%	3	100.0%	20	60.0%	18	66.66%
$2\frac{7}{10}$ to $2\frac{3}{10}$ "	1	100.0%	4	100.0%	5	40.0%	10	90.0%
$2\frac{1}{10}$ to $1\frac{9}{29}$ "	0	0.0%	0	0%	1	100.0%	5	100.0%

The following table from the same source compares forceps directly with version in contracted pelves, but of sufficient dimensions to admit of the extraction of a non-mutilated fetus:

INFANTILE MORTALITY IN CONTRACTED PELVIS AFTER VERSION AND FORCEPS.

	INFANTS.			
	No. of Cases.	*Living.*	*Dead.*	*Mortality.*
Forceps . .	45	24	21	46.5%
Version . .	20	17	3	15.0%

From the second table our position is confirmed that in moderate degrees of pelvic contraction with the head movable above the brim the best interests of the child are subserved by a timely resort to version.

LITERATURE CONCERNING VERSION.

Text-books on Obstetrics by Lusk, Playfair, Charpentier and others.
BORINSKI: Contracted Pelvis; Arch. f. Gyn., iv. 226.
LOEWENHARDT: Version in Contracted Pelvis; Arch. f. Gyn., viii. 421.
GOODELL: Version in Contracted Pelvis; Trans. Internat. Med. Cong., 1876, 777.

CHAPTER XVII.

MATERNAL CAUSES DURING LABOR—(Continued.)

Symphyseotomy.—Within the past few years—chiefly through the writings of Pinard and Leopold, on the continent, and Harris in this country—the operation of symphyseotomy, as revived by Morisani, has again come into prominence. As its aim is legitimate in its tendency to save both mother and child, it must be regarded as a valuable resource in cases of obstructed labor due to contracted pelvis. As one of the principal alternatives, in doubtful cases, consists in the performance of craniotomy, the serious importance of this practically new operation from the standpoint of the child will very readily be appreciated.

Past statistics have been bad, and later statistics, taken collectively, have not been good. Like most statistics, however, the deductions are fallible for various reasons. The fact that an operator uses no judgment and attempts the operation, as has been done, when the child was known to be dead, does not invalidate the operation in a similar case with a living child, but it increases the fetal mortality. Similarly an inexperienced or clumsy operator, carried away by an excess of zeal, may, through faulty technique, lose both mother and child. Lastly, even surgeons of experience attempting this operation for the first time may meet obstacles which may unfavorably influence the fate of mother and child. Thus even the careful statistics of Neugebauer, who records a maternal mortality of twelve per cent. in two hundred and eight cases operated between 1887 and 1893, or those of Harris, who places the maternal mortality at twelve per cent. and the fetal mortality at twenty per cent., must be taken *cum grano salis*. To be sure, individual operators of ability have had poor success with the operation at times. Thus Richard Braun v. Fernwald recently reports twelve symphyseotomies with four maternal deaths. Of eight children alluded to three were lost. But to counterbalance this discouraging report, we have quite a series of suc-

cessful cases in the practice of others. Take an operator like Morisani himself, and we learn from his latest statistics of fifty-five operations, that he lost only two mothers and three children. Pinard succeeded in saving nineteen out of twenty mothers and most of the children. Zweifel, in twenty-three cases, has saved all the mothers and twenty-one children. Fritsch has done the operation four times, saving all of the mothers and two of the children. Broomall, in this country, reports three cases with the loss of one child. V. Woerz reports ten cases in which one mother was lost and all of the children were saved. In New York City Dr. Edgar has done four symphyseotomies, saving all of the mothers and children. From this especially selected series of one hundred and thirty-one symphyseotomies we get approximately a maternal mortality of six and one-tenth per cent. and a fetal mortality of ten per cent. May we not hope that in the course of time the rate of mortality taken collectively from all sources will not exceed these figures?

The operation is indicated in cases of contracted pelvis, ranging from three and one-half inches (Morisani) down to two and three-fourths inches (Harris) in the conjugate diameter. The operation is contra-indicated in the cases of very feeble or dead children. The indications were very thoroughly discussed at the last International Congress at Rome (1894), and the writer will briefly quote the views of those who took part in the discussion.

Morisani advised the operation in pelves measuring two and three-fourths to three and one-half inches in the conjugate, provided the child was strong and the cervix decidedly open. With a conjugate of three and two-tenths inches he advised trial with the forceps first. He claimed that symphyseotomy can replace the Cesarian section in many cases.

Leopold cautioned the general practitioner not to attempt the operation, and to avoid it in primiparæ. He placed the limits of contraction at three inches to two and two-fifths inches, and advised performing the operation in a hospital only. He considered a conjugate diameter of two and four-fifths inches in flattened pelvis and three inches in justo minor pelvis the lowest limits indicating a symphyseotomy.

Zweifel thought that in time the general practitioner would be able to substitute this operation for perforation.

Sänger, influenced by his excellent results with Cesarian section—twelve cases without a death—was rather disposed to keep the operation of symphyseotomy in the back-ground.

Pinard maintained that an aseptic symphyseotomy was free from danger. He limited the operation to a conjugate of two and four-fifths inches; in cases with a narrower conjugate he advised the Porro operation. He expressed himself as eternally opposed to embryotomy on the living child, and, in appropriate cases, would rather resort to ischio-pubiotomy, or coccygotomy.

Finally, Harris, in this country, advises against symphyseotomy in cases with a very short conjugate. He recommends, in case of operation, no delay, good surroundings, and accurate determination of the size of the pelvis—the lowest limit of which must not be less than two and three-fourths inches.

In doing this operation attention to details is essential for success. With a pelvis of two and three-fourths inches to three inches in the conjugate, in a multipara, and with a larger corresponding diameter in a primipara, with a vigorous child, with the cervix well dilated, and, if possible, the bag of waters unruptured, the patient is placed in Walcher's position under the influence of an anæsthetic, and under the usual aseptic surroundings of every major operation. After the soft tissues have been divided and the symphysis pubes separated, an assistant delivers the child by forceps or version, and the wound is closed and treated on general surgical principles.

Literature Concerning Symphyseotomy.

Coggin: The First Symphyseotomy in America, March 12, 1892, xxix. 62.

Garrigues: Symphyseotomy; Am. J. f. Obst., 1893, xxviii. 626.

Burns and Atherton: Symphyseotomy, etc.; recovery of mother and child; Dominion Medical Monthly, 1893, i. 50.

Fleischl: Premature Labor, or Symphyseotomy; Pest. Med. Chir. Presse, xxix. 929.

Kennarc and Kreider: Symphyseotomy Compared with its Substitutes; Fr. iii. Med. Soc., 1893, xliii. 62.

Pinard: Nineteen Symphyseotomies; Rev. d'Obst. et de Pædiat., 1893, vi. 65; also Annal. de Gyn. et d'Obst., 1894, xli. 1.

Hirst: Two Cesarian Sections and Three Symphyseotomies; Trans. Col. Phys., Phil., 1893.

Noble: Report of a Case of Symphyseotomy; Trans. Col. Phys., Phil., 1893, xv. 51.

Dimmock: Symphyseotomy, etc., Craniotomy, etc.; Br. M. Journ., 1892, i., 1312.

Garrigues: On Symphyseotomy; Med. Rec., 1894, xix. 577.

Grandin: Discussion, etc.; Trans. M. Soc. N. Y., 1893, 106.
Dickinson: Symphyseotomy; N. Y. Med. Rec., 1893, Nov. 25.
Cobb: Symphyseotomy; N. Y. Med. J., 1893, August 26.
Broomall: Three Cases of Symphyseotomy, etc.; Am. J. f. Obst., 1893, xix.
Morisani: Symphyseotomy; Ann. di Ostet. e Ginecol., 1893.
Brown: Symphyseotomy Saving Mother and Child; N. Y. Med. Rec., 1893, Nov. 4.
V. Braun, R.: Eleven Cases of Symphyseotomy with Three Maternal Deaths; Wien. Klin. Woch., 1893, No. 35.
Eustachie, G.: Symphyseotomy; Nouv. Arch. d'Obst. et de Gynéc., 1893, vi.
Trépant: Symphyseotomy; Rev. Gen. de Med. de Chir. et d'Obst, 1893, xlviii.
Auvard: Symphyseotomy Successful for Mother and Child; Arch. de Tocol. et de Gynéc., 1893, xx. 893.
Harris, R.: Symphyseotomy in North and South America; Med. News, 1893, lxvi. 141; also Jour. of Obst., May, 1894, 705.
Müller: Symphyseotomy; child dead, mother survived; Berl. Klin. Woch., 1893, xlvii.
V. Rosthorn: Symphyseotomy; child asphyxiated, mother survived; Prag. Med. Woch., 1893, xlix.
Neugebauer: Symphyseotomy Statistics; Centr. f. Gyn., 1894, xix. 445.
Braun v. Fernwald, R.: Twelve Symphyseotomies; Centralbl. f. Gyn., 1894, xxxvii. 882.
Zweifel: Twenty-three Symphyseotomies; Centr. f. Gyn., 1894, xv.
Fritsch: Four Symphyseotomies; Centr. f. Gyn., 1894, xix. 455.
Proceedings of International Congress held at Rome, 1894; Centr. f. Gyn., 1894, xv.
Lewers: Case of Symphyseotomy, Journ. of Obst., 1894, May.
Leopold: Symphyseotomy; Centr. f. Gyn., 1894, xix. 445.
Smyley: Symphyseotomy; Med. Annual, 1894, 534.
Schwaktz: Symphyseotomy saving mother and child; Arch. f. Gyn., xix. 445.
Büssemaker, B.: Symphyseotomy, etc.; Centr. f. Gyn., 1894, xxxvii. 896.
V. Woerz, H.: Results of Symphyseotomy; Centralbl. f. Gyn., 1894, xxxvi. 865.
Solowij: Symphyseotomy; Centr. f. Gyn., 1894, xxxvi. 862.
Olshausen: Spontaneous Birth, etc.; Centr. f. Gyn., 1894, xxxvii. 857.
Müllerheim: Symyhysiotomy; Samml. Klin. Vorträg, 1894, xci.
Edgar: Symphyseotomy; N. Y. Med. Journ., 1894, lix. 343.
Gaulard: Symphyseotomy; Presse Méd., Paris, 1894, xxxiii.

CHAPTER XVIII.

MATERNAL CAUSES DURING LABOR—(Continued.)

Cesarian Section.—In the practice of obstetrics the law will always exist that, in case of obstructed labor, the interests of the mother must always predominate over those of the child. Thus, in looking at the older statistics of Cesarian section with the maternal mortality ranging between fifty-four and sixty per cent. (Mayer, Harris), with a saving of even less than half the children (Harris), we can readily understand why this operation should have fallen into disrepute and craniotomy almost universally resorted to. When we remember that the maternal mortality after this latter operation only amounted to four to twelve per cent. according to different authorities (Determann, Lewers, Leopold), we must grant that our predecessors were right in giving preference to that method of operative interference which only subjected the mother to one-sixth or one-tenth of the dangers of the Cesarian section. But we have entered upon a new era. Selected statistics are making a favorable showing. In the literature of the past four years the writer has found over a hundred successful Cesarian sections reported by individual operators. Sänger alone has done one hundred and twenty Cesarian sections with only seventeen deaths (Olshausen), and his last dozen cases without a single death. Zweifel has lost in eighteen cases only one mother and one child (Harris). Cameron saved nine mothers and ten children in ten operations. In Leopold's ten cases, nine mothers and all of the children were saved (Charpentier). Fritsch has had seven cases without a death (Grandin). Winckel (1889) places the maternal mortality at eight and six-tenths per cent., whereas Harris, later (1893), in one hundred and forty-two European Cesarian sections, in the practice of selected operators, finds a maternal mortality of only seven per cent. This does not deny that general statistics from all sources show a mortality of fourteen to twenty per cent. (Olshausen, Leopold). But if, under select circumstances, we can claim a maternal mortality of

seven per cent., and a fetal mortality of only six per cent., what a wonderful stride we have made! What a wonderful advance can we boast of when, at the close of the nineteenth century, we can claim that we have almost equalized the risks of Cesarian section and Craniotomy from the maternal standpoint, and, at the same time, instead of destroying the life of the child, have given it nearly every chance of life!

The absolute indication, in cases of deformed pelvis, for performing this operation, is an antero posterior diameter of two and one-half inches or less. With a larger conjugate than this, fair chances are offered to mother and child by other procedures—spontaneous labor, induced premature labor, version, forceps and symphyseotomy. Below this limit no woman ought to be allowed to enter upon labor without being prepared for abdominal section. The medical profession must, however, in the interests of children, otherwise hopelessly doomed, learn to deliberately elect the Cesarian section. Take a case, for example, near to full term, with external measurements showing an abnormal state of affairs. Internally we may determine that the pelvis is narrower than normal by one and a half or two inches antero-posteriorly, or perhaps in all directions. With a fetus of average size the presumption is fair that such a child cannot possibly be born alive, and the process of labor may likewise cost the mother her life. In such a case prepare at once for Cesarian section. If no pains are present, induce labor several hours before the operation. According to Olshausen, Cesarian section offers the best chances in cases where the bag of waters is unruptured, and where the previous history excludes the chance of the normal termination of labor.

The method of operation now usually chosen is the so-called "Improved Cesarian Section." The Porro operation has been rejected by most operators, except in cases of rupture of the uterus, because the constriction of the neck of the uterus with an elastic tube is apt to be followed by asphyxia of the child. According to Harris twenty-one per cent. of the children are lost. The laparo-elytrotomy of Thomas is rarely performed. In performing the Improved Cesarian Section of Sänger and Leopold, Garrigues advises: "Antiseptic treatment; early operation; turning uterus out of abdominal cavity; sutures at upper angle of abdominal wall, so as to promptly tie them when the uterus is turned out; gutta-percha tissue behind turned-out uterus;

rubber tube about cervix; uterus to be wrapped in warm cloths so as to avoid shock; uterine suture." Harris says: "Time and technique must go hand in-hand if the death-rate is to reach a lower percentage." This operation can and has been done in about twenty minutes by skillful operators.

Literature Concerning Cesarian Section.

Wenzel: Successful Cesarian Section, saving mother and child; Ann. Gyn. & Paed., 1890–1, iv. 593.

Pozzoli: Sänger Operation, saving mother and child; Ateneo med. parmense, 1890, iv. 257.

Fry: Report of Successful Cesarian Section; Trans. Am Gyn. Soc., 1890, xv. 378.

Goulliard: Conservative Cesarian Section, mother and child saved; Arch. de Tocol. 1890, xvii. 757.

Crimail: Second Cesarian Section, successful for mother and child; Ann. de Gyn. et d'Obst., 1891, xxxv. 372.

Thieme: Cesarian Section, successful for mother and child; Med. Warszaw, 1891, xix. 305.

Campbell: Successful Porro Operation for mother and child in Private Practice; Lancet, 1891, ii. 289.

Hill: Successful Cesarian Section; Proceedings Conn. Med. Soc., Bridgeport, 1891, iv. 133.

Simon: Cesarian Section, successful for mother and child; Sitz d. Ärtz Bezirks in Erlangen, 1889–90.

Bompiani: Second and Third Cesarian Section, etc., saving mother and child; Bull. di r. Acad. Med. di Rom., 1889–90, xvi. 351.

Arnott: A Successful Cesarian Section; Trans. M. and Phys. Soc. Bombay, 1887–89, xiii. 30.

Harris: The Present and Improved Statistics of Cesarian Section; Trans. Am. Gyn. Soc., 1891, xvi. 111.

Harris: The Possible Results of Cesarian Delivery; Am. J. Med. Sc., 1891, cii. 371.

Carmichael: Porro Operation, saving mother and child; Lancet, 1891, ii. 985.

Harris: Statistics of European Cesarian Section; Am J. Med. Sc., 1891, cii. 371.

Neumann: Cesarian Section, Recovery, Hygeia, Stockholm, 1891, liii. 168

Macom: Successful Cesarian Section; Tr. Roy. Med. Ireland, 1890, viii. 307.

Pugliatti: Porro Operation, saving mother and child; Ann. di Ost. Milani, 1891, xiii. 653.

Riochini: Conservative Cesarian Section, saving mother and child; Riform Med. Napoli, 1891, vii. 217.

V. Troyer: Conservative Cesarian Section, saving mother and child; Wien. Klin. Woch., 1891, iv 945.

Maclaren: Porro Operation, mother saved, child lost, etc.; Br. Med. J., 1891, i. 514.

Granger: Cesarian Section, saving mother and child; Br. Med. J., 1891, i. 515.

Ashton: Successful Porro Mueller Operation, mother and child saved; Med. News, 1891, lviii. 369.

Grandin: Is Embryotomy of the Living Fetus Justifiable? N. Y. Med. Rec., 1891, xxxix. 641.
Cameron: Ten Cases of Cesarian Section; Br. Med. J., 1891, i. 509.
Bossi: Successful Porro Operation; Gazz di ospit Napoli, 1891, xii. 397.
Gibbon: Successful Cesarian Section; Occid. Med. Times, 1891, v. 372.
MacPheeter: Successful Porro Operation; Recovery of mother and child; Med. Rec., Nov. 3, 1894, 567.
Martino: Successful Porro Operation, saving mother and child; Rassegna d'Ostet. e ginec. Napoli, 1892, i. 129.
Briggs: Successful Porro Operation; Liverpool M. Chir. J., xii. 240.
Ludlam: Cesarian Section, successful for mother and child; Clin. Chicag., 1892, xiii. 573.
Guéniot: Cesarian Section, mother and child saved; Bull. et Mém. Soc. Obst. et Gyn. de Paris, 1891, 34.
Mazurkevich: Second Cesarian Section, in same woman; J. Akush i. jenskboliez, St. Petersburgh, 1892, vi. 27.
Kollock: Cesarian Section, saving mother and child; Virg. M. Monthly, 1892–3, xix. 417.
Runge: Successful Porro Operation, etc.; Arch. f. Gyn. 1891, xli. 116.
McKelway: Cesarian Section; J. Am. Med. Sc., xix. 1892, 5.
Lewers: Craniotomy and Cesarian Section, etc.; Br. M. Journ., 1892, i. 1081.
Block: Porro Operation, saving mother and child; Br. M. J., 1892, ii. 128.
Thomas: Successful Cesarian Section, saving mother and child; N. Y. Med. Rec. 1892, xli. 534.
Bigger: Second Cesarian Section, in same woman, living child; N. Y. Med. Rec., 1892, xli. 538.
Bishop: Cesarian Section, safety of child and death of mother; N. Am. J. Homeop., N. Y., 1893, viii. 230.
Griffith: Successful Cesarian Section, for mother and child; Post Grad., 1893, viii.
Harris: Porro Cesarian Section, during sixteen years, etc.; N. Y. J. Gyn. and Obst., 1893, iii. 273.
Hirst: Two Cesarian Sections, and three Symphyseotomies; Trans. Col. Phys. Phil. 1893.
Barnera: Cesarian Section, successful for mother and child; Arch. de Tocol. et de Gyn., 1893, xx. 945.
Calahan: Successful Porro Operation; Dublin Jour. Med. Sc, 1893, vi. 153.
Van der Branden: Cesarian Section, successful for mother and child; J. d'accouch. de Liège, 1893, xiv. 129.
Zinke: Successful Cesarian Section; Ohio Med. J, 1893, iv. 135.
Mitchell: Successful Cesarian Section; J. Am. Med. Ass., 1893, xxi. 345.
Napier: Successful Cesarian Section; Trans. Obst. Soc., London, 1893, xxxiv.
Stande: Three Cases of Cesarian Section; Centr. f. Gyn., 1893, xvii. 777.
Noble: Successful Cesarian Section; Gyn. and Ped, 1892–3, vi. 196.
Smith: Successful Cesarian Section; Am. J. Obst., 1893, xxvii. 102.
Kezmarozky: Cesarian Section, child asphyxiated, mother saved; Centr. f. Gyn., 1893, xxvii.
Courant: Porro Operation; Central. f. Gyn., 1893, xliii.

KARPER: Two Cases, one mother and both children saved; Ztg. f. Gebts. u. Gyn., 1893, xxvii. (2).
V. VELITS: Craniotomy or Cesarian Section; Arch. f. Gyn., xliii. 196.
GENER: Porro Operation, etc., saving mother and child; Centr. f. Gyn., xvi. 1894.
CÖRNER: Fifty Cesarian Sections; Arb. a. d. k. Frauenklinik in Dresden, 1893, xii. 27.
PICQUÉ: Cesarian Section, successful for mother and child; Bull. mém. Soc. de Chir. de Paris, 1893, xix. 144.
CHARLES: Three Cases of Cesarian Section, successful to mother and child; Bull. Acad. Roy de Med. de Belg., 1893, vii. 617.
CULLINGSWORTH: Two Cases of Cesarian Section, etc., both mother and children saved; Lancet, 1893, ii. 1382.
HERMAN: Three Cases of Cesarian Section; Lancet, 1893, 1508.
SKÉSA: Cesarian Section, saving mother and child; Leipsic, 1893, xvii. 1060.
MARTINO: Four Cases of Porro Operation, saving mothers and children; Rasseg. d'ost. e ginec. Napoli, 1893, iii. 313.
RABAGLIATI: Successful Case of Cesarian Section; Med. Press and Circ., London, 1893, lvi. 497.
SCHNEIDER: Conservative Cesarian Section, mother and child saved; Centr. f. Gyn., 1893, xvii. 1057.
DUDLEY: Successful Cesarian Section; Post Graduate, 1893, viii. 88.
HARRIS: Successful Cesarian Section; N. Y. Med. Rec., 1894, xlv.
SKEDA: Two Successful Porro Operations; Tokay Med. Woch., 1894, viii. 26.
EVERKE: Cesarian Section; Centr. f. Gyn., 1794, xxiv. 589.

Summary of Treatment in Contracted Pelvis.—What is the proper course to pursue in the different grades of pelvic contraction regarding the best interests of the child as well as those of the mother? In pelves measuring four inches or more in the conjugate the best interests of the child will be subserved by temporizing, keeping a careful watch, however, on the progress of labor, the nature of the labor pains, and the condition of the fetal heart. At three and a half inches in the conjugate, if discovered during pregnancy, induced labor about the end of the thirty-fourth week offers the best chances of a spontaneous delivery; but, unless every attention can be given the child, it is apt to succumb to prematurity. If the contraction is only discovered at the time of labor, the decision between forceps and version must be determined by the condition of mobility or immobility of the fetal head. In pelves ranging between three and a half and two and three-quarter inches, induced labor at the end of the thirty-second week offers a doubtful prognosis for the premature child. During labor, symphyseotomy, followed by forceps or version, offers the child a fair chance of life, although subjecting the mother to grave operative risks. With a

conjugate measuring two and a half inches or less, Cesarian section offers the only chance for the child with somewhat increased risks over craniotomy for the mother.

Craniotomy.—In the cases considered the condition of mother and child has been presumed to be good. Where this is not the case, particularly if the child be positively dead, then, and then only, can the question of craniotomy come up for consideration. Craniotomy of the living child is still advocated by certain recent writers (Leopold, Rosenberg) under circumstances where the general condition of the mother is precarious. Others are equally opposed to the procedure (Pinard, Grandin). The general drift, however, of modern obstetric surgery is so clear that it will not be many years before perforation of a living child will be regarded as a barbarism of the past, and even perforation of dead children will become an operation of great rarity. There was a time, not many years ago, when craniotomy was resorted to three or four times more frequently than forceps (Playfair), but with the progress of our science we hear less and less of this horrible operation. The only indication to-day for the operations of craniotomy, decapitation, or evisceration, is first and always the certainty of the child's death. Then only in certain cases of large fetal head or body, tumors, monstrosities, impaction after version, etc., is this operation at all justifiable.

Literature Concerning Craniotomy.

Barker: Craniotomy; Proc. Phil. Co. Med. Soc., 1892, xiii. 132.
Leopold: Craniotomy; Cent. f. Gyn., 1894, xix. 445.
Rosenberg; Craniotomy; Am. J. Obst, 1892, xxvi. 307.
Sjödahl: Craniotomy; Eira, Stockholm, 1891, xv. 320.
Pinard: Discussion on Symphyseotomy Int. Med. Cong. at Rome, 1894.
Demmer: Technique of the Perforation of the After-coming Head; Cent. f. Gyn., 1894, xlv. 1125.

CHAPTER XIX.

MATERNAL CAUSES DURING LABOR—(Continued.)

4. RUPTURE OF THE UTERUS.

Although a very rare accident during the progress of labor, rupture of the uterus deserves a moment's notice on account of the grave dangers run by both mother and child. In the writer's experience with over fifteen hundred deliveries, this accident occurred only once, and in such slight degree that, after rapid instrumental delivery, both mother and child were saved. In the practice of medical colleagues the writer, however, knows of two cases in which both children and one mother were lost. Charpentier has collected one hundred and ninety-seven cases of traumatic rupture following version, forceps, various unwise manipulations during labor, and cephalotripsy. This proves how slowly and deliberately the accoucheur must act in deciding upon operative interference during labor.

As a sign of impending rupture of the uterus McClintock has called attention to the cessation of the fetal heart-sounds. This again emphasizes the necessity of auscultating the fetal heart from time to time during labor. The prognosis to the child is almost necessarily fatal from shock, profuse maternal hemorrhage, strangulation of the cord or important fetal parts, and the loss of time in extracting the child. The figures of Ramsbotham and Franqué show two hundred and forty-three fetal deaths in two hundred and sixty-three cases (Charpentier).

Left to nature, one hundred and forty-two children in one hundred and forty-four cases died (Charpentier). Of one hundred and fifty-four children delivered artificially, fifty-seven were saved (Charpentier). If the child is still in the uterus, therefore, its immediate extraction is urgently called for. Even laparotomy is indicated, for it gives the operator a chance to clean out the abdominal cavity of blood and remove the uterus. If the fetus is in the abdominal cavity, this is the only line of treatment possible. In forty cases of laparotomy under these circumstances, twenty-one women and two children were saved (Harris).

Note.—A very recent study of nineteen cases of rupture of the uterus has been published by Braun v. Fernwald. (Cent. f. Gyn., 1894, xlv. 1102.)

CHAPTER XX.

INFANTILE MORTALITY DUE TO FETAL CAUSES.

a. PRECEDING LABOR.

During pregnancy the child may lose its life from numerous causes, many of which have been described in detail in the preceding chapter. Their importance justifies a brief recapitulation. Paternal causes emanate from alterations of the semen and are mainly syphilitic in nature. Maternal causes include general diseases, irritability of the uterus, and various lesions connected with the placenta and membranes. Besides these causes, many external influences, traumatisms, elevation of maternal temperature, or acceleration of maternal heart-action, and the numerous possible obstructions to the utero-placental circulation, all tend to destroy the life of the child previous to the onset of labor.

On the part of the child itself we may have a series of conditions due to diseased states, multiple pregnancy, or intra-uterine accidents, which may destroy its life or threaten its existence. We shall now proceed to examine these conditions a little more in detail.

1. DISEASES OF THE FETUS IN UTERO.

Peritonitis is one of the most frequent diseases of the fetus previous to birth. Lorain found it present ten times in one hundred and six still-born infants. In one hundred and ninety-three children which were born alive but succumbed after several hours or days the same observer found it present in forty cases. In some of these latter cases meningitis, multiple abscesses, and erysipelas were also present (Charpentier). The so-called "puerperal affection" of the newly-born is characterized by the frequent presence of the lesions of peritonitis. According to Baginsky these children are infected in utero. Other lesions may be present, such as macerated skin, bloody or serous effusions in the cavities of the body, petechiae in the lungs, pericardium and pleura, ecchymosis in the liver and on the surface of the peritoneum, and fatty degeneration of the heart and liver.

The various fevers—as described in another chapter—may affect the fetus in utero. They embrace chiefly malarial fevers, typhoid fever, and the eruptive fevers.

Icterus may affect the fetus in utero, and is usually of fatal import. It may occur in connection with acute yellow atrophy of pregnancy, or be due to inherited syphilis, or any condition obstructing the flow of bile. It represents the "Symptomatic Icterus" (Runge) as distinguished from the "Icterus Neonatorum," which is a far milder condition, and which, as a rule, does not appear before the second day after birth.

The skin and cellular tissues may present a variety of lesions. Besides the characteristic rashes of the eruptive fevers and the lesions of dermatitis, ichthyosis, and pemphigus, we may find superficial or deep tumors (spina bifida, bronchocele, cancer, abscesses, etc.), and purulent ophthalmia.

Scrofulous affections are supposed by some to be of syphilitic origin, but there is reason to believe that they may emanate from other etiological sources. They occur chiefly in the form of congenital goître—the "Struma Intra-uterina Congenita" of Spiegelberg—which is characterized chiefly by simple parenchymatous hyperplasia.

The bones may be the seat of fractures due to defects in ossification, to non-union of the bony structures, to inflammatory separation of the epiphyses, to non-union of the diaphyses, to maternal injuries during pregnancy, or to congenital rachitis or syphilis. Luxations and spontaneous amputations of limbs have been recorded. Küstner recently calls attention to such amputations resulting from amniotic strings.

The cerebral lesions of the fetus are most frequently represented by hemorrhages, and may be located in the brain substance or meninges. The brain tissue may be hypertrophied, or the seat of hemicephalus (Scanzoni), or there may be atrophy of the brain substance in conjunction with hydrocephalus, or, according to Henoch, with cerebral hemorrhage.

The organs of respiration may be the seat of a number of intra-uterine diseases. Pneumonia, due to aspiration of decomposed amniotic liquid or of secretions from the genital canal, has been described by Küstner. Tuberculosis and emphysema have likewise been known to occur. Alterations of the thymus—chiefly syphilitic

in origin—have been met with. One of the best modern studies regarding the pathological lesions of this gland has been made by A. Jacobi.

The heart and blood-vessels may present a variety of abnormal states. Endocarditis with valvular lesions, pericarditis, dilatation, and adhesions may be found. Northrup, within the past year, reported a case of congenital pulmonary stenosis with incompleteness of the septum ventriculorum, and Droog reported a case of congenital dextro-cardia with hernia of the lung. The blood-vessels may be congenitally incompetent, or thin, or present evidences of disease or alterations in their walls. Among these hereditary syphilis, congenital atheromatous degeneration, fatty and hyaline degeneration, have been described. (Jacobi.)

The digestive tract.— Ulceration and discoloration of the stomach, whitish follicles at the cæcum, enteritis, with every degree of hyperemia of the intestine, bloody extravasations in its walls, intestinal perforations, and entozoa, have all been met with.

The liver and spleen may show the lesions of hepatitis and splenitis, which, as a rule, result from congenital syphilis. These organs may thus be the seat of softening, fatty degeneration, hypertrophy, or induration.

Congenital syphilis may manifest itself in the fetus in the form of superficial affections of the skin and mucous membranes, or as profound lesions involving the viscera and bones. Thus we usually look for rashes (such as pemphigus), oral mucous patches, and fissures at the angles of the lips and at the anus, as superficial evidences of this disease. The deeper lesions regularly involve four organs (Parrot): the liver (Gubler), the lungs (Virchow), the spleen (Parrot), and the thymus gland. The pancreas is frequently diseased (Birch-Hirschfeld). Occasionally lesions are found in the brain, kidneys and intestines. As elsewhere stated, fetal peritonitis is a frequent manifestation of syphilis (Simpson). The bones may show different lesions, which Parrot divides into four grades. The chief of these, according to Post, consists of an osteo-chondritis at the epiphyses, which is so characteristic of congenital syphilis that the diagnosis may be established from its presence alone. Finally, Behrend first described the congenital hemorrhagic form of syphilis, which is characterized by hemorrhage on the surface, in the large cavities, and practically in all

the viscera of the body. It is attributed to a diseased state of the blood-vessels.

Intra-uterine Rachitis, unlike congenital syphilis, cannot be positively traced to inherited disease. It is believed, however, that the impoverished state of the mother during pregnancy may have an important etiological bearing. Up to the present time only four authentic cases have been reported in the United States (Mason). According to Depaul, the fetal extremities are remarkable for their length and volume. The capacity of the thorax is considerable. The long bones are arched. The entire bony system seems to be invaded. Barlow and Bury consider intra-uterine rachitis as a graded disease, varying according to the period of onset and the activity of the morbid process. In certain cases the bones become so fragile as to break very readily. Cases of fetal cretinism, or "so-called fetal rickets," are generally still-born or survive only a short time if born alive. In these cases the most striking feature is the stunted appearance of the limbs in comparison with the size of the trunk. Kaufman very recently again calls attention to cases presenting changes in the cartilages which simulate but are not identical with fetal rachitis.

The diagnosis and, consequently, the treatment of these various diseased processes in utero are, at the present stage of our knowledge, beyond our reach. In a woman, however, who is repeatedly delivered of still-born children, the examination of the fetus and placenta may throw light upon the nature and origin of the disease, and, in certain instances, give us indications for future preventive treatment. Thus, a fetus presenting evidences of rachitis, would give us the clue of putting the mother on careful hygienic and dietetic treatment, with the addition of such drugs as phosphorus or cod-liver oil. The fact of syphilis being discovered in the fetus would give us the clear indication of subjecting both parents to a thorough course of anti-syphilitic treatment. And even with no discoverable cause, the precept of Depaul ought to be followed in those women who repeatedly abort or give birth to successive still-born children, by placing them under a similar course of treatment. Even induction of labor, prior to the expected time of the death of the fetus, is considered justifiable. Where the habitual death of the fetus can be indirectly traced to the mother, from general or local pathological states, the careful physician will search for these causes and map out a corresponding plan of treatment.

Literature Concerning Diseases of the Fetus.

Charpentier: Cyclopedia of Obstetrics and Gynecology, N. Y., 1887.
Baginsky: Text-Book on Diseases of Children; Berlin, 1892.
Gueniot: General Anasarca causing the death of a five months' fetus.. Bull. et Mem. Soc. et Gyn. de Paris, 1893, 39.
Runge: Diseases of the First Days of Life; Stuttgart, 1893; Icteras, p. 216.
Semb: Primary Sarcoma of the Kidney in a Still-born Child; Cent. f. Gyn., 1894, xliv., 1089.
Küstner: Intra-uterine Amputations, due to amniotic strings; Veh. d. X. Int. Med. Cong., Berlin, 1891, iii. 8 Abth. 63.
Northrup: Congenital Pulmonary Stenosis, etc., Arch. Paed., 1894, ix. 763.
Droog: Congenital Dextro-Cardia, etc., Arch. of Paed., 1894, ix. 672.
Küstner: Fetal Pneumonia; Arch. f. Gyn., xi 1877, 256.
Jacobi: Extra-Cranial Aneurism in Early Life. Veh. d. X. Intern. Med. Cong., Berlin 1891.
Jacobi: Heart and Blood-vessels in the Young. Brooklyn Med. J., Meh., 1888.
Conroy: Syphilitic Hemorrhagica Neonatorum; Arch. Paed., 1894, ix. 693.
Didav: Syphilis in New-born Children, etc. Wood's Library.
Post: Cyclopedia of Diseases of Children, 1889, ii.; Syphilis.
Vogel and Biedert: Text-book on Diseases of Children; Stuttgart, 1890.
Mason: Congenital Rachitis; Arch. Pad., 1894, ix. 670.
Kaufman: Fetal Pseudo-Rachitis; Centr. f. Gyn., 1894, xxxi. 748.
Barlow and Bury: Cyclopedia of Diseases of Children, 1889, ii. 224.
Grandin: Cyclopedia of Obstetrics and Gynecology, N. Y., 1887.

CHAPTER XXI.

FETAL CAUSES PRECEDING LABOR—(Continued.)

2. MULTIPLE PREGNANCY.

The simultaneous presence of two or more fetuses in utero is often responsible for the death of one or more of them previous to the onset of labor. The writer attended a lady in labor during the seventh month of pregnancy, and, after the child was delivered, was surprised to find a second fetus in utero. On its expulsion it was found to be of not more than three or four months' development. In this case evidently the one fetus had died early and, after several months, had induced the expulsion of the second child. Eustace reports two similar cases; one fetus, in the one case, dying four or five days, and, in the second case, fourteen days, before birth. Schultze reports a case of twins in which the one child had reached term, and the second was an undeveloped fetus of six-weeks' growth. Haushalter and Schul have recently reported a case of twin pregnancy, with pulpy transformation of one fetus and atrophy of the corresponding portion of the placenta. The risk of twins becoming twisted in the umbilical cords and strangulated is greatest when they are both in one sac (Herman). Charpentier refers to twelve such cases.

The vitality of twins is naturally below par; but that of triplets is worse. Of one hundred and ninety-two twin births, reported by Reuss from the Würzburg Clinic, fifty-one did not reach full term. It is very seldom in triplets that the three children should survive (Playfair). Congenital debility is responsible usually for their early demise in utero, or shortly after birth. In a case of triplets reported by Buzzanella, one was born living and the other two were in a papyraceous state. In a case of v. Erlach's, one of the children was papyraceous. In a case of Helme's, one of the children was dead previous to birth.

Literature Concerning Multiple Pregnancy.

Eustace: Death of one fetus in twin pregnancy; Centr. f. Gyn., 1894, xxxv. 856.
Schultze: Case of Twins, one full term, and the other six weeks; Volkmann's Samml., xxxiv.
Herman: Twins in one sac; Arch. f. Gyn, 1891, xl. 250.
Haushalter and Schul: Pulpy transformation of one fetus, in twin pregnancy; Arch. de Tocol. et de Gynéc., 1891, xviii. 906.
Bazzanella: Triplets; two papyraceous; Central. f. Gyn., 1891, xv. 625.
Barbour: Triplets; Tr Edinburgh Obst. Soc., 1890-1, xvi. 172.
V. Erlach: Triplets; Centr. f. Gyn., 1894, xviii. 439.
Helme: Triplets; Br. M. J., 1892, i. 961.

3. intra-uterine accidents.

Although *maternal falls and direct injuries* to the abdominal walls may result in the death of the child in utero, the chief causes productive of this result emanate from the umbilical cord or premature detachment of the placenta.

Torsion of the Umbilical Cord occurs most frequently at about the seventh month and chiefly in multiparæ (Spiegelberg). When extreme the exaggerated spiral twists may prove fatal to the child by obstructing the circulation in the blood-vessels. Spaeth mentions three cases in which this caused the death of the fetus, and the writer has seen one case. The abnormal condition is favored by an unusual length of the cord, the torsion occurring, as a rule, at the umbilical end. Although still permeable, the blood-vessels at the seat of torsion are almost entirely occluded. Thrombi, bloody serum in the abdominal cavity of the fetus, œdema, and cystic degeneration of the cord, are frequently met with in these cases (Lusk). Although Martin, Schauta, and others regard the torsion as a post-mortem change and attribute the death of the fetus to syphilis, placental endo-metritis, or hemorrhage, there seems to be good reason to believe that these excessive twists are due in the majority of cases to fetal movements.

Spontaneous rupture of the cord in utero, although exceedingly rare, is possible. Funke very recently has published a case of extensive hydramnion, in which the torn cord presented before the os was dilated.

Knots of the cord are said to occur once in two hundred cases. Although frequently harmless, they may, at times, occasion grave or fatal disturbance in the fetal circulation. Géry refers to two cases in which

knots caused the death of the fetus. Veit reports the case of an intra-uterine macerated fetus with a knot in the cord and a coil about the neck. Ferrari reports a similar case.

Coiling of the cord about the fetus, when rapidly developed, may, in rare cases, by the interruption in the feto-placental circulation, lead to the child's death. Similarly may a limb become constricted and its circulation cut off, leading to its imperfect growth, or even causing amputation or fetal death. If the constriction involve the neck, strangulation or even amputation of the head may result. Numerous coilings may likewise so interfere with the circulation through the umbilical vessels by direct pressure as to cause the death of the fetus. Nearly half a century ago Krahmer pointed out that, under these circumstances, the child might make premature efforts at respiration in utero and lose its life. Still it is wonderful at times how frequently the cord is found coiled about the child's neck without doing any damage. The writer has delivered living children with three and four coils about the neck. Cases with remarkable convolutions have, within the past few years, been reported by Simpson, Loviot and others.

Stenosis of the umbilical vessels is usually attributed to syphilis (Lusk), and is prejudicial to the fetus in direct proportion to its grade of development.

Ante-partum hemorrhage or Accidental hemorrhage resulting from partial detachment of the placenta offers a bad prognosis for the mother, but a much worse one for the child. Of one hundred and seven children only six were saved (Goodell).

The prognosis of these various conditions is, at times, quite grave for the fetus. In cases of twin pregnancy, Sedlaczek reported ten cases of twists or knots of the cord with coiling of the cord about the fetus in two cases. Of these, six ended in miscarriage, and only six out of the twenty children were born alive. Herman adds six other cases. Of these thirty-two children, in one case the result was unknown, six children were born living and twenty-four children were lost.

The diagnosis and, hence, the preventive treatment of these various conditions are mostly beyond our reach at the present stage of our science. If discovered during labor, the cord constricting the child's neck has been divided between ligatures with the hand in the vagina. After the birth of the head there should be no hesitation in boldly

dividing one or more coils about the neck if the prospect of delivering the child immediately is in doubt, or if it is not possible to gently draw down the cord and disengage it. In a case in which the child's face was black from the strangulation due to four coils tightly constricting the neck, the writer rapidly cut through the four coils with one sweep of the scissors and succeeded in saving the child.

Literature Concerning Intra-Uterine Accidents.

Gérv: Knots in the Cord; L'Union Méd., October, 1876.
Funke: Rupture of the Cord in Utero; Central. f. Gyn., 1894, xxxi. 740.
Martin: Torsion of the Cord; Ztsch. f. Gebts. u. Gynäk., 1878, 346.
Schauta: Torsion of the Cord; Arch. f. Gyn., 1881, 7υ.
Simpson: Convolutions of the Cord; Tr. Obst. Soc. (Edinburgh), 1889–90, xv. 31.
Veit: Coiling and Knot of the Cord; Ztsch. f. Gebtsk. u. Gyn., 1893, xxv. 367.
Ferrari: Coiling and Knot of the Cord; Gazz. Med. Lomb. Milano., 1893, li. 141.
Loviot: Coiling of the Cord; Bull. et Mem. Soc., Obst. et Gynéc. de Paris, 1892, 14.
Krahmer: Prolapse and Coiling of the Cord; Deut. Klinik, 1852, xxvi. 289.
Lyneker. Coiling of the Cord; Deut. Med. Ztg., 1891, xii. 649.
Sedlaczek: Twists or Knots of the Cord in Twin Pregnancy; Arch. f. Gyn., 1885, xxvi. 309.
Herman: Twists or Knots of Cord in Twin Pregnancy, Arch. f. Gyn., 1891, xl. 253.

CHAPTER XXII.

INFANTILE MORTALITY DUE TO FETAL CAUSES.

b. DURING LABOR.

The dangers to fetal life emanating from the child itself during the progress of labor are numerous and serious. They embrace dystocia from malpositions or malpresentations of the fetus, prolapse of the umbilical cord, errors in the length of the umbilical cord, multiple pregnancy, prolapse of various parts at one time, excessive development of the fetus, diseased states of the fetal head, neck and body, and constitutional weakness.

1. MALPOSITIONS OR MALPRESENTATIONS OF THE FETUS. VERTEX PRESENTATIONS.

In 97 per cent. of all cases of labor, the child presents with the vertex (Spiegelberg). When the occiput is anterior and the occipito-frontal diameter corresponds with the right sacro-iliac diameter of the maternal pelvis we have what is called the "first position." By imagining the occiput to be anterior or posterior and directed to the right or to the left we have the four varieties of vertex presentations described by most English and American authorities. In vertex cases the prognosis for the child is best, the rate of mortality being only 2 per cent (Dubois). With every deviation from the occipito-anterior presentation the risks to the child increase. The mechanism of labor in vertex cases is thoroughly described in all text-books on obstetrics. It may be mentioned, in passing, that occipito-posterior positions of the vertex, by strong flexion on the trunk, usually become converted into occipito-anterior positions, thus considerably reducing the risks to the child.

Vertex Cases with the Occiput-anterior, in roomy pelves, with good labor pains, require very little assistance from the attending accoucheur. These cases readily deliver themselves, and represent the class in which "meddlesome midwifery" should be scrupulously

avoided in the interests of both mother and child. Where the labor, however, becomes delayed from inefficient labor-pains, or from moderate obstructions in the pelvic strait, after a careful watch on the fetal heart, and after using a proper amount of discretion, it would be gross negligence not to assist such a labor by uterine expression or forceps or version. For over-delay, like over-haste, may cost the child its life; and the happy physician is he whose judgment is so accurately balanced as to keep him in all cases from the one extreme or the other.

Vertex Cases with the Occiput-posterior occur, according to Uvedale West, once in thirty-three labors. The child's life is endangered chiefly from the fact that labor is apt to be slow and tedious. Most authors are agreed that, if discovered early, the case should be left to nature, as spontaneous rotation of the occiput anteriorly will occur in the majority of cases. Here the "non-nocere" method of treatment is peculiarly applicable. Playfair advises against over-active endeavors at assistance, as rotation may occur at a very advanced stage of labor. This rotation does not begin until the fetal head meets with the resistance from the pelvic floor, and becomes strongly flexed. Parry advises assisting this process under chloroform by seizing the vertex and at once effecting rotation. Tarnier attempts to bring the occiput forwards by two fingers placed behind the child's ears. Burns and Smellie try to convert the occiput into a face. Harris advises preserving the bag of waters as long as possible. Meyer recently reports three cases in which he succeeded in rotating the occiput anteriorly, with the hand in the vagina, under chloroform. The writer has also been successful with this manœuvre in several cases without an anesthetic. Although some authors (Lange, Scanzoni, Tyler Smith) advise the use of forceps in performing this rotation; others (Barnes, Schroeder) are just as firmly opposed; while still others (Charpentier, Barnes and Fehling) allow the use of forceps, using simple traction without attempting rotation. The reason for this diversity of opinion lies in the fact that, in using blind force in attempting rotation with the forceps, the body may not accompany the movements of the head, and twisting of the child's neck, with inevitable death, must ensue.

With some modifications the rules recently laid down by S. Marx are fairly safe. If the labor-pains are good, the waters intact, and the

pelvis roomy, expectant treatment is indicated. Interference may be imperative in four sets of cases: First, with the head above the brim an attempt may be made to rotate the head anteriorly with the hand in the vagina, and, if this proves unfeasible, to do a version. Secondly, with the head fixed at the superior strait, this writer advises rotation with the forceps. We are opposed to this procedure on account of the great risk which the child runs of having its head twisted on its neck by the blind force used. Manual rotation anteriorly or version, after pushing up the head, or, if the occiput is fixed, forceps or symphyseotomy, gives the child a much better chance for its life. Thirdly, with the head in the pelvic basin, the resort to Tarnier forceps is advised as a traction force, allowing rotation to occur spontaneously if it will. With this we agree, but we are again opposed to the advice to force rotation if this fails. Fourthly, with the head low down upon the pelvic floor, the use of short, straight forceps is advised to deliver the occiput posteriorly. If the head becomes impacted, the choice lies between symphyseotomy and perforation. Recently Murray, of New York, performed symphyseotomy in such a case, and the interests of the child leave no room to question the propriety of this operation in preference to its alternative—perforation.

Literature Concerning Occipito-Posterior Positions.

Parry: Occipito-Posterior Positions of the Vertex; Am. J. Obst., May, 1875.

Marx: The Management of Occipito-Posterior Positions; N. Y. Med. Rec., May 12, 1894.

Manual Reduction in Occipito-Posterior Positions; Bull. et Mem. Soc. Obst. et Gyn. de Paris, 1894–5.

Keiser: Torsion of the Neck in Vertex Presentations; Univ. M. Mag., 1893–4, vi. 467.

Wenning: Manual Rectification of certain Malpositions of the Head; Tr. Am. Ass. Obst. and Gyn., 1891, iv. 289.

Meyer: Occipito-Posterior Positions; Arch. f. Gyn., 1891, xl. 95.

Palmer: Management of Occipito-Posterior Positions, Ohio M. J., 1893, iv. 31.

Loviot: Manual Rotation of Vertex or Forceps; Bull. and Mém. Soc. Obst. et Gynéc. de Paris, 1892, 215.

Charles: Occipito Posterior Presentation Successfully Treated by Loviot's Method; J. d'Accouchement, Liège, 1892, xiii. 73.

Henry: Twisting of the Neck in Vertex Presentations; Ann. de Gynée. et d'Obst., xxxv. 276.

CHAPTER XXIII.

FETAL CAUSES DURING LABOR—(Continued.)

BROW PRESENTATION.

Of thirty-four children presenting by the brow (Lusk), ten were spontaneously delivered without change, of which four were born dead. Ten others became spontaneously converted into face or vertex cases, with the loss of one child. Of the thirteen children extracted with forceps—the brow presenting in nine—two children were lost. In an able paper, recently published by Otto von Weiss, we find the following interesting data regarding infantile mortality in these cases:

24 cases, spontaneous conversion to face, infantile mortality,	17 per cent.
29 cases, spontaneous conversion to vertex, infantile mortality,	9 "
73 cases, brow birth point of rotation at superior maxilla, infantile mortality,	21 "
15 cases, direct birth of brow without rotation, infantile mortality,	60 "
34 cases, brow birth, point of rotation at nose, infantile mortality,	23 "
6 cases, version and extraction, infantile mortality,	40 "
15 cases, manual conversion to face or vertex, infantile mortality,	21 "
22 cases, craniotomy, infantile mortality,	100 "

Lusk states that if the face persists in a posterior position the delivery of a living child is hardly possible. Playfair says that the majority of these cases become spontaneously converted into a vertex or face presentation, depending on the occurrence of flexion or extension. In the former case the prognosis for the child is best, in the latter case the chances of a living child are also good. Spontaneous rotation about the superior maxilla or root of the nose and manual conversions to face or vertex presentations offer fair chances for the child. Spontaneous birth of brow without rotation and delivery after version with extraction offer a bad prognosis for the child.

If the prospect is favorable for a spontaneous conversion to a vertex or face presentation the duty of the accoucheur, in the interests of the child, is to leave the case to nature. If by Bandelocque's method the hand in the vagina can readily convert the brow into a vertex case, this should be attempted before or with the rupture of the bag of waters. The writer found this manœuvre quite easy in the case of a multipara without an anesthetic. With the opposite hand applied externally the manœuvre may be materially assisted. Peters converted three brow cases, and v. Weiss four cases into vertex presentations, and saved all of the children. The method of Schatz aims at substituting the face for the brow by traction on the superior maxilla, with two fingers in the mouth, but is associated with the danger of premature inspiratory efforts on the part of the child. If the head reverts to its former position, forceps may be employed to keep it in place, and rotation may be assisted about the superior maxilla or root of the nose. In mento-posterior positions, which offer the worst prognosis for the child, the attempt should be made, under chloroform, to rotate the chin forwards. In all cases with a living child—previous to a resort to craniotomy—the question of performing symphyseotomy should be considered, and, if necessary, be followed by manual conversion to face or vertex, forceps or version.

Literature Concerning Brow Presentation.

Cognard: Brow Presentation; J. de Sages femmes, 1892, xxi. 291.
V. Weiss: Brow Presentation; Samml Klin. Vortrag, 1893, lxxiv. 712.
Patterson: Brow in Rickety Pelvis; Lancet, 1893, vi. 1185.
V. Steinbuchel: Face and Brow Presentations; Cent. f. Gyn., 1894, xlv. 1133.
Polosson: Mechanism of Labor in Brow Presentation; Cent. f. Gyn., 1894, xlv. 1134.

FACE PRESENTATION.

According to different authorities face presentation occurs within wide limits of frequency. In English practice it is said to occur once in two hundred and forty-nine to four hundred and ninety-seven labors. In German practice it is said to occur once in one hundred and sixty-nine labors. The writer, in over 1500 deliveries, only met it three times. The infantile mortality is ten to thirteen per cent., and depends principally on cerebral congestion due to pressure on the jugular veins. The average length of labor is said not to exceed by

much that of vertex cases, but is more readily affected by weak pains, contracted pelvis, and rigidity of the parturient canal.

The normal mechanism of labor in face presentation consists of descent and extension—instead of flexion, as in ordinary vertex cases—rotation forwards of the chin beneath the pubic arch, flexion and external rotation. In those cases in which the chin persists in remaining posteriorly, spontaneous delivery is very rare. The face may spontaneously become converted into a vertex which offers a better prognosis for the child, especially in mento-posterior cases.

The methods of treatment recommended by authorities vary. In all cases it is advisable to turn the woman on the side toward which the chin is directed and to avoid rupturing the membranes, as the engagement of the head is usually slow and accomplished with difficulty (Lusk). Playfair states that by temporizing a successful result will occur in the majority of cases. In forty cases treated on the expectant plan Zeller lost only two children, and Boër in eighty cases lost only three or four. Winckel's more recent studies, however, were not so favorable, for in a large number of collected cases he found an infantile mortality of thirteen per cent. V. Weiss treated fifty-eight cases on the expectant plan, but was obliged, owing to the premature escape of the waters and contracted pelvis, to terminate labor in ten by operative procedures.

The dangers of forceps in these cases can be inferred from the fact that of eighteen cases published by Salomon only one living child was extracted.

The older practice of resorting to version is no longer advised by recent writers, except in certain cases of large head with prolapse of a limb or of the cord (Jewell), or in cases in which the membranes rupture early or manual dilatation of the cervix offers especial dangers, or in neglected cases, in which manual flexion is contra-indicated.

The method of Schatz consists in the employment of external manipulations. By first seizing the shoulders and trunk through the abdominal walls and lifting the chest upwards and then pressing it backwards, at the same time raising the breech with the other hand, and finally pressing the breech downwards, the normal flexion of the trunk is restored and the face becomes spontaneously converted into the vertex. But this manœuvre is only applicable previous to the

time of rupture of the membranes and in the absence of abdominal or uterine irritability.

In the Baudelocque-Schatz method an anesthetic is given, if necessary, and the woman is placed in the lateral decubitus. The chin is pressed upwards with one hand in the vagina, while, at the same time, the other hand, pressing externally, forces the occiput downwards. This substitutes flexion for the extension of the head. With the outside hand the chest is pushed backwards and, lastly, the breech downwards. In nine cases treated by this plan, v. Weiss saved all of the mothers and children. Peters converted thirteen face into vertex cases, and lost only one child. Bullitt converted a face into a vertex case and applied forceps, delivering a living child.

In mento-posterior positions it would be great folly to leave the case to nature, although it is claimed that spontaneous delivery is possible (Jewett). The various methods just described, or forcible conversion into a vertex presentation under anesthetics, with the full hand in the vagina, followed by forceps if necessary, or resort to symphyseotomy, should receive careful consideration before proceeding to craniotomy. Symphyseotomy has been done in this country in such cases, and is advised by such writers as Noble and Lusk.

At the nineteenth annual meeting of the American Gynecological Society, the indications for treatment in face presentation were so clearly stated by Reynolds that we quote them in full:

1. Before engagement and previous to rupture of the membranes hope for spontaneous restoration of flexion. Resort to postural treatment and gentle external manipulations.

2. When the membranes have ruptured early, an external or bipolar version should be performed at once, in any case in which the condition of the cervix renders manual dilatation dangerous; but in ordinary conditions manual dilatation should be undertaken, the head flexed by the hand, and subsequently the appropriate operation performed.

3. With the cervix completely dilated and membranes unruptured, with anterior position of the chin, leave the case to nature as long as progress is rapid and the fetal heart is steady; otherwise anesthetize the patient and forcibly flex the head. The posterior position of the occiput so produced should not be left to nature, but should be treated by version or, preferably, rotated to the front. It may then be left to nature or treated by forceps.

4. Posterior positions of the chin should never be left to nature, but should be subjected to immediate manual flexation. The anterior position of the occiput, which then results, may either be left to nature or treated with forceps.

5. In neglected cases, in which manual flexation is contra-indicated, version should be chosen if practicable; if contra-indicated, apply forceps to the face, but see that the chin is anterior.

6. In cases in which the face presentation is due to some other mechanical obstruction, the treatment should be determined by the latter factor. The abdominal methods of delivery are never indicated in uncomplicated face labor.

Literature Concerning Face Presentation.

Schatz: Face Presentation; Arch. f. Gyn., v. 313.

Report of Nineteenth Annual Meeting of the Am. Gyn. Soc., N. Y. Med. Rec., June 9th, 1894, 739.

Face Presentation; Courier de Méd., 1894, xliv. 41.

Charles: Expectant Treatment of Face Labor; J. d'Accouche, Liège, 1892, xiii. 145.

Budin: Face Presentation: Bull. et Mem. Soc. Obst. et Gynéc. de Paris, 1893, 208.

V. Weiss: Treatment of Face and Brow Presentations; Samml. Klin. Vortrag, lxxiv., 1893, 683.

Poitou Duplessy: Persistent Mento-posterior Position of Face; Rev. Obst. et Gyn., 1892, viii. 182.

Bernardy: Treatment of Posterior Face Presentations; Med. Bul., 1893, xv. 455.

Lewers: Axis-traction in Face Presentations; Clin. Jour., London, 1892-3, i. 120.

Bullitt: Face Presentation with Rotation into Sacral Cavity; N. Y. Med. Rec., 1894, 136.

Inclined Positions of the Vertex.

This variety of head presentation is not quite common, and is almost entirely neglected in text-books on obstetrics. Several American writers have described cases (Garrignes, Brothers). The German's allude to it as "Parietal-Bone Presentation." Cazeaux and Tarnier give it a slight notice under the above heading, and American writers allude to its most marked form as "Ear Presentation." The writer has met with at least three cases, and is certain that it is frequently overlooked. Litzmann met with 23 cases in 1200 deliveries, but only one case was extreme, presenting by the ear. As the condition consists of a lateral flexion of the head on the neck, and many of the milder cases rectify themselves through the action of the child's

strained neck-muscles (Michaelis), it will be readily understood why these cases are frequently overlooked.

As many of the children, however, are sacrificed in this presentation, a word regarding diagnosis will be à propos. The discovery of a presenting ear will at once determine the diagnosis. In minor degrees of lateral vertex flexion, the tilted position of the head can at times be felt above the brim, but during labor it descends behind the symphysis. Internal examination reveals the sagittal suture lying almost parallel, and in front of the transverse diameter of the pelvis. Usually the posterior parietal bone is pushed beneath the one lying anteriorly, but occasionally this may be reversed. The caput succedaneum is on the posterior parietal bone.

In large pelves the prognosis is not unfavorable if the labor-pains are strong. Such cases terminate spontaneously. To a certain extent assistance might be rendered by backward pressure applied through the abdomen by the hand or bandage. In a case of pure ear presentation the writer succeeded, with the full hand in the vagina, in seizing the vertex, correcting the lateral flexion, turning the occiput anteriorly, and flexing the head on the neck. After a few pains the child was delivered spontaneously, although labor had been delayed for hours previous to the manœuvre. When such a procedure is not possible, version offers the best prognosis for the child. In five cases left to nature, three children were lost. In five others, in which version was performed, all the children were saved (Veit). The use of forceps is contra-indicated unless the pelvis is unusually roomy, for the head is practically wedged in a transverse diameter. In neglected cases symphyseotomy is indicated, if the child is living, and perforation if the child is dead.

Literature Concerning Inclined Position of the Vertex.

Cazeaux and Farnier : Text-books on Obstetrics.

Veit : Posterior Parietal-Bone Presentation; Ztschr. f. Gebts. u. Gynäk, iv. 229.

Litzmann : Posterior Parietal-Bone Presentation; Arch. f. Gyn., 43.

Brothers : Case of Ear-Presentation ; Am. Gynec. Journ., 1892.

Gottschalk : On Posterior Parietal-Bone Presentation; Cent. f. Gyn., 1894, xlv. 1132.

CHAPTER XXIV.

FETAL CAUSES DURING LABOR—(Continued.)

BREECH PRESENTATION.

In one hundred and sixty-seven still-births recorded at the New York Bureau of Vital Statistics, eighteen—or nearly eleven per cent. —presented by the breech. In a published series of two hundred and nine successive labors, von Ramdohr met foot presentations five times. The frequency of presentation by the breech varies between once in fifty-two cases (Churchill) to once in three hundred and eighty-eight cases (Ramsbotham).

Dubois places the infantile mortality at a little over ten per cent. Churchill places the mortality at thirty-one per cent., but Playfair regards this as an exaggeration. When we recall that in vertex cases the mortality does not exceed two per cent. we can readily perceive that a presentation of the breech means considerably increased risks for the child. A few instances from the writer's experience will illustrate these sources of danger.

Case I.—A hospital patient so successfully concealed her pregnant state, while being treated for subacute rheumatism, that her condition was not known until the nurse found her groaning much more than usual, and, on investigation, found the feet and body of a child delivered in bed. Before assistance arrived to complete the delivery the child was dead.

Case II.—A primipara had been in labor all day. In the absence of the attending physician the child was suddenly expelled by the breech, but the head remained undelivered. When assistance arrived a quarter of an hour later it was impossible to resuscitate the child.

Case III.—A primipara was taken with labor-pains during the eighth month. The breech presented with extended thighs. During delivery one femur was broken, and the child was born asphyxiated. After much trouble it was resuscitated, but died after forty-eight hours.

Case IV.—A multipara had six previous confinements, excepting the first, with breech presentations. The membranes ruptured early, and the pulsating umbilical cord presented with the breech. With beginning irregularity in the fetal pulse, after full dilatation of the os, one foot was brought down. The cord at once ceased pulsating, and the child was felt to make several convulsive movements and then become quiet. In less than five minutes the child was delivered dead, and all attempts at resuscitation proved futile.

The dangers to the child are self-evident. The abnormal position of the fetus favors pressure of the cord, coiling of the cord about the child or prolapsus, early and complete escape of the liquor amnii, premature separation of the placenta, in part due to contraction of the uterus during the time in which the bulk of the body is being expelled and arresting placental circulation, or compression of the placenta between the contracted uterus and the hard mass of the fetal skull. Besides all this, the child runs increased risks of getting various injuries. Rugé has collected twenty-nine cases of fractures or other injuries under these circumstances.

All authors are agreed that, after the birth of the body, the dangers to the child are in direct ratio to the time which elapses in the delivery of the after-coming head. The umbilical cord, extending as it does from the umbilicus of the child to the still adherent placenta in utero, must necessarily be subjected to the pressure of the thorax and head of the child against the pelvic bones, as they, in turn, come into the world. If this pressure is sufficient, the blood-supply to the fetus is completely shut off, the fetal blood is no longer properly aerated, the medulla is irritated, and the child makes premature efforts at inspiration. In consequence of this asphyxia results, and, if there is much delay in the birth of the head, it assumes a serious aspect and the child may lose its life.

Theoretically the treatment of breech cases is clear. If it is possible, previous to the rupture of the membranes, to substitute the vertex for the breech, this would at once reduce the dangers to the minimum. As this can only be carried out in multiparæ previous to the rupture of the membranes and descent of the child, we must do our best with the breech presenting. In the first place, it is necessary to try and have the os sufficiently softened and dilated, so that the after-coming head can be delivered in the shortest possible space of

time. To attain this end, protraction of the first stage of labor and preservation of the bag of waters should be encouraged as long as the fetal heart-sounds are distinct and regular. It is advisable to make as few examinations as possible. Counter-pressure with a distended elastic bag against the cervix is advised by some. Even with the os fully dilated it may be well to leave the expulsion of the trunk to nature. Once, however, the body of the child is delivered, there should be no delay in the birth of the head. In assisting the delivery of the after-coming head, it is well again to call attention to the delicate structures of the newly-born, and to caution against making too strong or too persistent traction at the neck. It is well to bear in mind that if the head is firmly caught above the pelvic brim or is tightly grasped by the cervix, violent efforts at traction from below may do more mischief than a few moments' delay, even acknowledging the risk from pressure on the umbilical cord. Dohrn, after podalic version, has called attention to the fact that a long absence of the fetal pulse does not prove absolutely the death of the child, as such children have been successfully brought back to life. Many of these cases present unexpected difficulty in the birth of the shoulders or from extension of the arms above the head. With a little perseverance the lower arm can usually be brought down delivering the same shoulder, and then the same procedure can be repeated with the upper arm. In the cases in which one arm is located behind the child's neck a much greater difficulty is encountered. In a case of this sort, recently met with by the writer, labor could only be terminated by the use of so much force exerted at the affected shoulder that the humerus of the child was fractured. The manœuvre, however, allowed of such a gain in space and time that the child was delivered alive, and, with an appropriate plaster-of-paris splint immediately applied, is to-day in perfect health. At times it may be advisable to apply forceps to the breech, but the risks to the child are numerous. In five hundred and eighty-four cases, at the Paris Clinic, in which forceps were applied to the breech, one hundred and thirty-two children were lost (Charpentier).

When, after delivery of the body, the head is impacted in the pelvis, various methods of procedure are available. After wrapping the child's body in a warmed cloth and placing it on the accoucheur's arm, the hand is introduced in the vagina in such a manner that the

index and middle fingers press to the sides of the child's nose, while the opposite hand forces down the occiput from without. This induces flexion of the child's head, if the dorsum is anterior. The trunk of the child being raised, the face is then made to sweep over the perineum.

In the Smellie-Veit method two fingers in the vagina are passed into the child's mouth, inducing flexion of the head, while the fingers of the other hand placed astraddle over the child's shoulders are used chiefly for traction. This method is said to be accompanied with the least dangers to the child, as the fingers in the mouth keep the jaw flexed and prevent twisting of the head on the neck at the same time that the chief force is applied to the shoulders.

The method of Charpentier de Ribes is applicable to the after-coming head at the brim. In order to determine flexion of the head the inferior maxilla is made the fulcrum. The body of the child is drawn backwards, and finally the hand of an assistant applied over the mother's abdomen expresses the frontal region in the direction of the superior strait.

In these cases, also, the "Prague method" has been extensively used. Scanzoni saved one hundred and seventeen out of one hundred and fifty-two infants by resorting to this plan. In the absence of labor-pains, an assistant must press the head downwards through the abdominal wall. With the dorsum anterior the accoucheur then seizes both feet with one hand and hooks the fingers of the other over the child's shoulders. The traction is first made in a downward direction, and, as the head descends, the extremities and body of the child are elevated more and more toward the abdomen of the mother.

If these means fail, forceps must be applied to the after-coming head, the blades being passed from beneath the child's elevated body. This will at times prove a very difficult task, the instruments slipping quite readily. In such cases, if the child is living and a rapid symphyseotomy can be performed, we think this should be done instead of resorting to the older practice of perforation or decapitation.

Literature Concerning Breech Presentation.

Chapter on Breech Presentation in Text-Books on Obstetrics by Lusk, Playfair and Charpentier.

Dubois: Breech Presentation; Mém. de l'Acad. Roy. de Med., iii. 450.

Dohrn: Absence of Fetal Pulse during Extraction; Arch. f. Gyn., 1874, vi. 364.
Loviot: Three Cases of Breech; Bul. et Mém. Soc., Obst. et Gynéc de Paris, 1892, 188.
Dickinson: Extraction of Extended Arms in Breech; N. Y. Jour. Gyn. and Obst., 1894, ii. 181.
Reynolds: The Value of Forceps in Complicated High Arrest of the Breech; Trans. Am. Gyn. Soc., 1892, xvii. 263.
Herzfeld: The After-coming Head; Centr. f. Gyn., 1893, xvii. 801.
Derivaux: Extraction of Fetal Head coming last, etc.; Am. Gyn. J., 1892, ii. 491.
Seymour: Delivery of the After Coming Head; Trans. Am. Asso. Obst. and Gyn., 1893, v. 431.
Knapp: Spontaneous Version, Breech to Vertex; Chicag. Clin. Rev., 1892-3, 154.
Murray: Breech Presentation; Arch. Gyn. Obst. and Pædiat., 1891, vi. 253.

CHAPTER XXV.

FETAL CAUSES DURING LABOR—(Continued.)

TRANSVERSE PRESENTATION.

In the records of one hundred and sixty-seven still-births, examined by the writer, ten were ascribed to transverse presentation. According to Churchill the shoulder presents in one out of two hundred and sixty cases of labor. In two hundred and thirty-five transverse presentations one-half of the children were lost. With such a startling infantile mortality early recognition of this condition and its proper treatment become matters of prime importance.

With lax abdominal walls, even prior to the onset of labor, this presentation can some times be mapped out by external abdominal palpation and corrected by external version, using lateral pressure with a binder to keep the child in place. During labor, the absence of a presenting part per vaginam at first, and later, the discovery of portions of the upper extremity, establish the diagnosis.

As in all other presentations nature makes a strong effort to deliver the child, but only in rare cases succeeds and then usually with the sacrifice of the child. Spontaneous version by which the breech or head is substituted for the shoulder is only possible with the fetus still undescended. When the body of the child becomes firmly wedged in the pelvic canal the only possible natural mode of delivery is by spontaneous evolution or, as the Germans put it, *con duplicate corpore*. This means practically the death-warrant of the child. Out of one hundred and twenty-five cases delivered in this manner one hundred and eleven children were born dead. In this form of delivery, the child's body becomes doubled on itself, and by continuous pressure from above, the head, or more frequently the breech, is delivered followed by the rest of the body.

In no other presentation is it so necessary, particularly in the interests of the child, to make an early diagnosis and institute proper treatment. With early diagnosis the various methods of procedure

are fairly easy in their accomplishment and the chances of delivering a living child are at their best; whereas a late diagnosis, with the arm prolapsed from the vagina and the shoulder wedged firmly in the pelvis, may mean extinction of the child's life from the impaction, or may require destruction of the child by the mutilating operations so abhorred by every conscientious practitioner.

In early cases of labor, as well as preceding labor, the knee-chest position might be tried alone or in conjunction with operative procedures. Or, it is often quite easy, by external manipulation alone, to substitute the head or breech for the shoulder. Or, by the Braxton-Hicks method, with two fingers in the vagina and the other hand working externally through the abdominal walls, it is often possible to change the presentation. These methods are only applicable in the early stages of labor previous to the rupture of the membranes. Although some writers prefer the head with the possible use of forceps later, the majority of practitioners prefer the foot, which allows of the possibility of more rapid delivery. Where the cervix is not fully dilated, it is advisable just to turn by one of these methods, seize a foot, and then wait, allowing the leg and thigh to gradually increase the cervical opening until its size is sufficient for the head to readily be delivered without the great danger to the child of being caught at the neck and strangulated. If the waters have escaped no time should be lost in performing a podalic version. In these operations the writer is convinced that, besides reducing the mother's suffering, the child's life is less endangered by the administration of an anesthetic, which so relaxes the parts as to render the manipulations much easier than without such an agent. Whether both feet or either foot is seized, will, as a rule, make very little difference. Still some writers advise one and some the other method. The writer believes, however, that if it is possible in bringing down one or both feet to make sure, at the same time, that the dorsum of the child is anterior, the danger to the latter will be materially diminished. A source of difficulty in these cases is the tendency of the arms to become extended above the child's head at a time when the operator's hand is apt to be quite fatigued from the task of bringing down a foot. By resting a moment and then re-introducing the hand along the child's abdomen into the uterine cavity and seizing the arm or forearm on the lower side and gently bringing it down it will be possible to deliver it and then repeat the

same proceedure on the opposite side. After getting down one foot, by waiting for labor-pains—if there is no especial hurry—the dorsum of the child will usually turn anteriorly. Nagel found this to be the case in eighteen observations. The after-coming head must be treated as described before. If the parts are so tightly wedged that they cannot be pushed backwards and permit of a podalic version, the child's life is practically doomed, and the attendant, who has allowed this condition of affairs to occur, is guilty of criminal negligence or perhaps worse. In these cases, embryotomy or decapitation offers the only method of delivery, and these measures mean death to the child, if it be not dead (which fortunately is usually the case) long before.

Literature Concerning Transverse Presentation.

Von Ramdohr: Obstetric Report of Work done at the P. G. Hospital; N. Y. Med. Woch., December 9, '93, 475.

Hoffman: Two Cases of Cephalic Version in Shoulder Presentations; Med. News, 1891, lviii. 550.

Spontaneous Evolution of a Case Presenting by the Right Shoulder; Rev. Med. de l'Est., 1894, xxvi. 119.

Mittra: The Treatment of Arm Presentations; Med. Rep, Calcutta, 1893, ii. 165.

Weeks: Notes in a Case of Spontaneous Evolution; Austr. Med. Gaz., 1890–1, x. 3.

Cesati: Twins, Transverse Presentation of Both, Double podalic Version; Raccogl. Med. Forli., 1890. x. 125.

De Swiecicki: In Shoulder Presentation Should we Rely on Nature or Interfere? Arch. de Tocol. et de Gyn., 1892, xix. 252.

Nagel: Study of Podalic Version, Using One Foot; Arch. f. Gyn., 1890–1, xxxix. 636.

Case of Natural Birth in Shoulder Presentation; Nederl. Tejdscht v. Verlosk, en Gynæc. Haarlem, 1890, ii. 259.

Lannin: A Case of Extra-cephalic Hernia, with Shoulder Presentation; Homeop. J. Obst., N. Y., 1892, xiv. 126.

Raineri: Spontaneous Evolution of a Fetus at Term; Ann. di Ostet., Milan, 1892, xiv. 17.

Steinheil: Spontaneous Termination of Labor in Shoulder Presentations; Central. f. Gynæc., 1894, xxiii. 562.

CHAPTER XXVI.

FETAL CAUSES DURING LABOR—(Continued.)

2. PROLAPSE OF UMBILICAL CORD.

Compression of the umbilical cord during child-birth offers one of the gravest dangers to the life of the child. In the 167 still-births elsewhere alluded to, the writer found that forty-seven, or 28 per cent., were traceable to compression of the umbilical cord, and twenty-six, or 15.5 per cent., were solely attributed to prolapsus. These figures indicate that, in over one-quarter of the cases of still-birth from all causes, compression of the umbilical cord plays the chief rôle.

Prolapsus of the funis is said to occur within wide limits of frequency. Churchill estimates its occurrence as once in 446½ labors, whereas Michaelis places it at once in 90 labors. Playfair suggests the lateral decubitus, observed during child-birth in English practice, as responsible for the lesser frequency of this accident in that country.

The infantile mortality varies between 37.6 per cent. (Hecker), and 53 per cent. (Scanzoni, Churchill). In 329 cases, collected from various sources, 263 children were lost (Charpentier). The prognosis to the child is modified by the nature of the presentation, the shape of the pelvis, and the duration of labor. Vertex presentation, associated with prolapse of the cord, offers the greatest danger to the child. When the child presents transversely or by the breech, the danger is considerably lessened. According to Englemann's studies, in vertex cases, 36 per cent. only of the children survive; in shoulder presentations, 50 per cent. of the children are saved; whereas cases presenting by the feet offer the best prognosis for the child, 68 per cent. being saved. In primiparæ the dangers to the child are greater than in multiparæ.

According as compression of the cord occurs rapidly or slowly, the asphyxia of the child may be rapid or slow. The existence of the fetus in utero depends on the removal of its carbonated blood with

excrementitious products, and the supply of fresh oxygenated blood from the placenta through the umbilical cord. Through its arteries and veins the cord at once subserves the double purpose of water-main and sewer. With pressure on the cord the child is in the same condition as a town with its fresh water-supply cut off and its sewer-pipes simultaneously clogged. The blood-vessels become gorged with carbonated blood, the medulla becomes irritated, the child makes efforts at inspiration, foreign bodies are aspirated into the air-passages, the pulmonary arteries become dilated with blood, the blood pressure in the right ventricle becomes lowered, and asphyxia, with finally paralysis of the heart, ensues. If a live pigeon is placed in a closed bell-jar, it becomes asphyxiated from the shutting off of oxygen and the accumulation of carbonic acid gas. The same thing happens with the child in utero whose umbilical cord is subjected to pressure. In either case, if the obstruction is removed early, and fresh air or oxygen supplied, recovery results. If the asphyxiated state has lasted too long, efforts at resuscitation are apt to prove futile.

The causes of prolapsus of the cord are divided by Charpentier into five classes: 1, conditions which render the fetus movable, as abundance of liquor amnii, small size of the fetus, and prolapsus of a limb; 2, causes which allow of a space in which the cord may engage, as want of contraction in the lower uterine segment, as in anomalous conditions with abnormal length of cord or multiparity, or as in pelvic deformities and uterine displacements; 3, causes which bring the cord near the cervix; 4, excessive length of the cord, premature rupture of the membranes, or precipitate escape of the liquor amnii in a woman standing erect; 5, attempts at version by the inexperienced.

The diagnosis of this accident is easy to all but the merest tyro in the practice of medicine. The writer has met with inexperienced practitioners who mistook the rim of the cervix for this condition, or overlooked it when higher up. The round feel of the cord, with its pulsating vessels—if the compression is not excessive—lying in front or to one side of the presenting part is sufficiently diagnostic, and it is the duty of the attending physician to keep a close watch on the character, regularity, and frequency of the pulsations, in the interests of the child's life.

Intelligent supervision and treatment of these cases is imperative if the child is to survive. If possible the physician's first aim should

be to get the cord out of harm's way and avoid compression. If the membranes are still unruptured and only a small coil of the cord has come down, the postural treatment first described by Thomas should be attempted. By placing the woman in the knee-chest position the effect of gravity may be sufficient to allow the cord to sink behind the presenting part. Theoretically the Trendelenberg position ought to be followed by the same result. The writer has elevated the pelvis in three cases and saved the three children. After the escape of the waters the cord can sometimes be pushed up with the hand in the vagina (Duncan, Tildesley) until the presenting part is firmly engaged or delivery accomplished with the aid of forceps. Renshaw has been successful with a moist sponge passed between the presenting part and uterine wall after reducing the prolapsus and leaving the case to nature. Where these means fail the cord may be seized in a looped tape passed through the end of a semi-elastic catheter and pushed out of harm's way, leaving the catheter, if necessary, in situ until the delivery of the child. Special instruments are usually superfluous and are usually not at hand when wanted. In intelligent hands reposition is fairly successful. Michaelis succeeded twenty-one times in thirty-five cases, and La Chapelle succeeded fourteen times in sixteen cases (Charpentier).

Unfortunately in some cases all efforts at reposition fail and, with such failure, the dangers to the child increase very rapidly. Under these circumstances, it is well to watch the pulsations with the fingers on the cord—in the intervals between the pains—and, with evidences of approaching danger, to rapidly complete delivery and rely on efforts at resuscitation. In these cases every preparation must be at hand so that not a moment is lost. This includes hot and cold water in separate basins on chairs at the bedside, warmed diapers or blankets, scissors, string, catheter, etc.

To illustrate the nature of the umbilical pulse in such a case the writer gives the following history taken from his case-book: Multipara, sixth confinement, moderately contracted pelvis requiring usually instrumental delivery. At six A. M. os fully dilated, vertex movable at the brim. At seven A. M. spontaneous rupture of the membranes, head partly engaged, but tilted somewhat laterally with small loop of umbilical cord to the right; pulsations one hundred and twenty per minute, regular and strong. Efforts at reposition during the next half hour by postural treatment, etc., without avail. In spite of

strong pains very little descent. Pulsations much feebler and show great divergence in the count. During pains pulsations feeble and sixty per minute, during intervals pulsations growing feebler and one hundred and thirty to one hundred and fifty per minute. With little probability of rapid, spontaneous termination of labor, and, as the compression of the cord is becoming serious, instrumental interference is advised to which patient readily assents. Being opposed to anesthetics and time being too limited to send for assistance, she is brought to the edge of the bed, the cord pushed back, the forceps carefully applied, and the child rapidly delivered in less than five minutes. The slight asphyxia is readily overcome by a few slaps on the buttocks.

Even in the absence of pulsation of the cord the rule should be to deliver the child as quickly as possible. Playfair and Charpentier claim that, if there is no pulsation in the cord, the child is evidently dead and the case should be left to nature. This teaching is incorrect, as, in exceptional cases, children have been rapidly delivered under these circumstances and resuscitated.

In breech cases where reposition has failed it is well to keep an eye on the pulsations of the cord, and, if there is evidence of danger, to rapidly extract the child in the usual manner. In cases of transverse presentation the danger to the child is least. Previous to rupture of the membranes bi-manual or external version may be attempted so as to get down a foot. With the os fully dilated, after the waters have escaped, a podalic version should be done under chloroform. In one such case the writer did a rapid podalic version fracturing the humerus, but succeeded in saving the child. In vertex cases it is wrong to wait for the natural expulsion of the child in cases of marked interference with the umbilical pulse or in cases of primiparæ. Once the os is fully dilated and the membranes ruptured, the woman should be anesthetized and the question of forceps or version decided on. If the head is not engaged at the brim, version is usually preferable. Forceps offer greater dangers to the child if the cord is prolapsed to any extent and irreducible, because they may include the cord and interrupt the fetal circulation. They offer also the additional disadvantage of tending to slip. Unless, therefore, a small portion of the cord is prolapsed which can readily be pushed up—as in the case narrated—the dangers to the child are greater in delivering with forceps than by resorting to version.

Literature Concerning Prolapsus of the Umbilical Cord.

Hahl: Report Lying-in Hospital, Halle; Mon. f. Gebtsk., 1877, ix. 279.

Duncan: Prolapse of Cord; Vertex; Flat Pelvis, Reduction of Cord; Living Child; Journ. de Sages Femmes 1892, xx. 91.

Westphalen: Injuries to Cord During Labor; Arch. f. Gyn., 1893–4, xlv. 94.

Renshaw: Prolapsus of the Umbilical Cord; Br. Med Jour., 1893, 519.

Brinton: Prolapsed Cord; Vertex; Podalic Version, Hemorrhage; Maryland Med. Journ., 1890, xxiv.

Scraggie: Prolapse of Umbilical Cord; Br. Med. Journ., 1893, i. 348.

Emery: An Improved Method of Managing Cord in Prolapsed Funis; Brook. Med. Jour., 1891, v. 317.

Tildesley: Case of Presentation of Funis; Successful Reposition; Lancet, 1893, ii. 631.

Charpentier: Cyclopedia of Obst. and Gynecology (Grandin); Chapter on Prolapsus of the Cord.

3. Errors in Length of the Umbilical Cord.

The normal length of the cord is eighteen inches. The cord may be too long or too short and become a source of danger to the child during the progress of labor. When too long, the chief dangers are from coiling about the neck or body of the child and prolapsus. Such coiling may prove serious even when the cord is of normal length. In exceptional cases the cord has measured as much as sixty inches. Coiling of the cord may result in protracting labor by shortening the distance between the child's body and the placental insertion; or it may prevent flexion of the head on the chest, or it may result in the spontaneous tearing of the cord, separation of the placenta, or the tearing out of the skin about the umbilicus, even opening up the peritoneal cavity. King has collected eleven cases, of which six children were lost. In the treatment of this condition, if the coils are discovered during labor about the child's neck or seem to retract the head during the intervals between the pains, it may be well to insert the hand in the vagina and, with scissors, carefully divide the coils and deliver rapidly; or, if this is not done, labor must be rapidly terminated with forceps, every preparation being at hand for asphyxia.

When too short, the cord, besides offering special dangers to the mother, such as inversion of the uterus, premature separation of the placenta, and protracted labor, becomes likewise of serious import to the child during labor. A fetal mortality of twenty per cent. (Lusk) is sufficient reason for giving these cases a little attention. Cases

have been recorded in which the umbilical cord varied between four and twelve inches in length. With this shortness of the cord the child could only descend to a certain degree beyond which the elasticity of the cord would exert itself, and after the cessation of the pain draw the child up again. Such persistent stretching of the cord is apt to interfere with the circulation in the cord and cause the intrauterine death of the child. In most cases it has been necessary to apply forceps, which usually was accompanied with premature separation of the placenta. The maternal hemorrhage in some of these cases has been quite alarming. The risks to the child have usually depended on the delay to labor and the stretching or tearing of the cord close to the abdominal wall, even opening up the peritoneal cavity. The marked recession of the head between labor-pains ought to excite suspicion of this condition (Hamill). Cases have been reported by Werder, Mackie, Kiely, Audebert, and others. The treatment, as in all cases where the labor is delayed without visible cause, consists in the artificial termination of labor with forceps. This does not materially increase the maternal danger, and may snatch the child from the dangers of protracted labor..

Literature Concerning Errors in Length of the Umbilical Cord.

Audebert: Dystocia due to shortness of Cord; Gaz. Hebdom. de Sc. Méd. de Bourdeaux, 1893; xiv. 364; Cent. f. Gyn., 1894, xxiv. 592.

Carbonelli: Dystocia from short Umbilical Cord; Stud. di Obst. e Gyné., Milan, 1890, 374.

King: Dystocia from short or Coiled Funis, etc.; Am. Journ. Obst., 1892, xxvi. 307.

Dudley: Labor Complicated by a very long Umbilical Cord; Northwest Lancet, 1893, xiii. 374.

Gallois: Consequences of Shortness of Umbilical Cord; Dauphine Méd., 1893, xvii. 245.

Thibaudet: Dystocia from Congenital shortness of Cord; J. de Sc. Méd. de Lille, 1891, i. 154.

Pinard & Varnier: Separation of Placenta through Shortness of Cord; Etudes d'Anat. Obst. Norm. et Path., 1892, 57.

CHAPTER XXVII.

FETAL CAUSES DURING LABOR—(CONTINUED.)

4. MULTIPLE PREGNANCY.

We again allude to the subject here, because of the dangers run by the children during the process of labor. It is well to bear in mind that twins are, as a rule, much smaller in development than single children, and are apt to be much weaker. Hence obstructions during labor may be accompanied with much greater risk for these children than for those of stronger build.

In spite of the rules laid down in text-books on obstetrics, very few practitioners make a diagnosis of multiple pregnancy previous to or even during labor, and it is usually only after the birth of the first child that the true state of affairs is recognized. Still, if two distinct fetal heart-beats, at different regions and with different counts, can be discovered, the diagnosis would be positive.

According to Charpentier both children may present by the vertex, or the first by the breech and the second by the vertex; or the first by the vertex and the second by the breech, or both by the breech; or the first by the vertex and the second by the trunk; or the first by the breech and the second by the trunk; or the first by the trunk and the second by the breech. Loviot recently reports a twin labor with no presentation—both children being freely movable, and requiring double podalic version.

The fetal mortality in multiple pregnancy is considerable—one out of thirteen (Clarke, Playfair). It depends on prematurity, unequal development, and malpositions—the last being the chief source of danger during labor. The figures of Reimann are quoted by most authors. In six cases of double vertex, of the six first born only one survived; of the six last born only two survived; therefore, of twelve children nine were lost. In cases of interlocking of the heads, one of the children is almost necessarily doomed. In such cases the danger arises from the fact that the neck of the first

child on entering the pelvis is subjected to great pressure by the head of the second child, and a similar pressure is exerted on the umbilical cord of the first child by the body of the second. In those cases in which one child presents by the breech and the other by the vertex, the prognosis for the children is much improved. In Reimann's twenty-six cases, three survived of the first born, and nineteen of the second born. Whether these figures represent the exact truth is open to question. The author's experience has been limited to five cases of twins, presenting in various positions, and he has been fortunate in delivering ten living children.

Labor in twin-pregnancy is usually protracted. With vertex presentation, as a rule, no interference is necessary until the cervix is fully dilated and the membranes ruptured. After this, delay means danger to the child, and, if not born within a reasonable period of time, it is proper to apply forceps to the presenting head. If the heads are interlocked, the genu-pectoral, or elevated-hip positions, may first be tried, and if delivery is not possible, the serious question of perforation or decapitation arises. The second child, if not already dead, ought to be delivered alive. After waiting a quarter or half-hour, and with no evidence of spontaneous labor-pains sufficient to effect delivery, interference must be decided on. It is true that in some cases one or two days longer have elapsed before the birth of the second child. But, in the interests of the child, labor ought to be terminated artificially, as the uterus by this time is usually exhausted. It is proper in such cases to resort to uterine friction or expression after rupturing the membranes. If the head of the second child is wedged in the pelvis, and labor-pains have become feeble, it is proper to deliver with forceps. If the head has not entered the pelvic strait, and is movable above the brim, podalic version should be done, as forceps applied under these circumstances offer great dangers for the child. The version is usually quite easy in these cases, as the uterus is large and the parts lax. Where one child presents by the vertex and the other by the breech, it is well to wait a sufficient length of time and allow the case to terminate spontaneously. In case of delay, after entering the pelvic strait, forceps should be applied to the first, and, if necessary, the thigh of the second child can be brought down. In cases of vertex or breech in the first, with shoulder presentation in the second child, it is possible, in rare instances, for a spontaneous

termination. The rule is, however, that besides the usual delay in cases of spontaneous delivery of the first child, the second must be assisted by the accoucheur. In two of the writer's cases, the first child presented by the vertex and required instrumental delivery, while the second child, presenting by the shoulder, required podalic version. All the children were extracted alive.

Literature Concerning Twin Labor.

Twin Pregnancy, one breech, the other shoulder; spontaneous delivery of both by breech after spontaneous version of the second; Rev. Obst. et Gynéc., Paris, 1893, ix. 103.

Loviot: Twins; Forceps to first, Version in second; Bull. et Mém. Soc. Obstet. et Gynéc. de Paris, 1892, 190.

De Lantour: Case of Twins; Locked Heads; New Zeal. Med. Journ., 1892, v. 225.

Lathorp: Twins born fifty-three hours apart; Am. Lancet, 1890, xvi. 447.

O'Reilly: Unusual Case of Twins; Lancet, 1892, i. 817.

Ensor: Genu pectoral Position in Certain Unfavorable Presentations; Br. Med. Jour., 1893, 519.

Loviot: Twins; No Presentation; Bull. et Mem. Soc. Obst. et Gyn. de Paris, 1892, 126.

Reimann: Twins; Am. J. Obstet., 1877, 58.

5. prolapse of various parts at one time.

Owing to the increased danger to which the life of the child is subjected when the presentation is complicated by the prolapse of the cord or a limb, the subject is deserving of a short notice. Cases complicated by prolapsus of the cord have been considered elsewhere. We are, at present, concerned with those cases in which the presence, at or above the superior strait, of a part of the fetus, which does not belong to the presentation, is discovered. Thus, the head may be associated with the hand, arm, both hands, or a foot. The breech may be associated with the hand or arm. Or the foot, both hands, and the cord may present simultaneously. Such prolapse of the limbs complicating labor is rare. In 17,613 labors Depaul found prolapsus of the extremities alone or with the cord in one hundred and sixty-three. Lachapelle in 15,652 labors met prolapsus of extremities alone or with the cord only forty-five times. The prognosis for the child becomes very serious where several limbs are prolapsed at one time, especially if they become impacted. Not only can such prolapse of members exist previous to labor, but the sudden gush of the liquor amnii previous to

engagement of the vertex or breech may carry down a hand or foot. Also, in efforts at version in shoulder cases, the child's hand in the vagina may remain after bringing down a foot. Or in vertex or face cases the writer, after bringing down a foot, has at times found it extremely difficult to push up the presenting part. These cases are particularly unfortunate, for, besides the vertex or face or hand, the presence of a foot only complicates and makes matters worse for the child unless it is possible to push up the originally presenting part. In cases of prolapsus of one or both arms alongside of the head, previous to rupture of the membranes, the woman should be put in bed and made to assume the knee-chest position. Or the pelvis of the patient should be considerably elevated to simulate the Trendelenberg position and the patient kept on her back. After rupture of the membranes, the entire hand should be introduced in the vagina, and the prolapsed part held above until the descent of the head. If the pelvis is roomy forceps may be used. In one reported case, however, the child's arm became engaged in the fenestrum of the forceps (Journ. Am. Med. Ass'n, 1891, xvi. 906). Version may likewise be indicated. Perforation should only be thought of if the child is positively dead. In those cases of breech in which a hand is prolapsed there is usually not much danger, as it can, as a rule, be pushed up before or after the foot comes down. In fact, in cases of transverse presentation with prolapsus of the hand, this is the usual condition present after version.

Prolapsus of hand or foot with face presentation is very ominous for the child. The writer once met a case of face presentation in which podalic version was decided on. After getting down a foot to a certain distance it was impossible to budge the face. This made matters worse than before. As perforation seemed inevitable the foot was returned into the uterine cavity and another effort with the full hand in the uterus was made to convert the face into a vertex. This fortunately succeeded, and, after a few good pains, the child was born.

The simultaneous prolapse of upper and lower extremities usually means the death of the fetus. The only treatment consists in seizing one or both lower limbs and delivering as after version.

Prolapse of one or both feet with the head was met with eighteen times in two hundred and seventy-eight cases (Depaul). Gautier recently reports prolapsus of a foot in a vertex case in which he suc-

ceeded in pushing up the foot (Cent. f. Gyn., 1894, xliii. 1086). If the feet can be pushed up, the head ought to be delivered naturally or if necessary by forceps. If it seems more feasible, the head might be pushed back, the feet drawn down, and the delivery completed as after version.

6. EXCESSIVE DEVELOPMENT OF THE FETUS.

One of the greatest dangers to the life of the child arises from over-development. Although the heads of male children are said to be larger than those of females (Simpson), no trouble is apt to ensue unless the increase in size becomes excessive. Ordinarily a child weighing eight pounds or less will not give rise to much difficulty during the process of birth in a pelvis of normal size. In children weighing ten pounds or more the dangers to the child increase, and, with a weight of fifteen or twenty pounds, the prognosis for the child is practically hopeless if delivery is to be completed in the usual manner through the regular passages. Although the writer has never met a new-born child weighing more than thirteen pounds, authentic cases are on record in which the child's weight varied between fifteen and twenty-three pounds (Charpentier). Recently Maygrier reported the case of a fetus weighing thirteen and a half pounds (Rév. Obstet. et Gynéc., 1891, vii. p. 136), and Harris, one weighing fourteen pounds (Lancet, 1892, ii. p. 256). Such excess in size may depend on large parental development, although the author has known parents of only medium build to have children never weighing less than ten pounds. An occasional cause for such excessive development can be traced to protracted pregnancy. Although the normal period of gestation is about two hundred and eighty days, women often carry longer. The writer can report a carefully observed case in which the period of gestation exceeded the normal by nearly six weeks in a primipara. The excessively developed child—unfortunately not weighed—was lost during labor from delay in delivering the shoulders after the head had safely been brought down by forceps. Similar cases have been reported by others. In Harris' case in which the fetus weighed fourteen pounds the pregnancy extended over a period of three hundred and twenty-five days. Loviot recently reports a case in which labor began three hundred and seven days after the last menstrual flow. After manual rotation of the vertex, forceps were applied and a living child, exceed-

ing nine pounds in weight, was delivered (Bull. et Mém. Soc. Obst. et Gynéc. de Paris, 1892, p. 215). When the pelvis is small only moderate increase in the size of the child, combined with absence of rotation in the shoulders, may cause death through delayed delivery.

If the pelvis is large there may be no especial difficulty in the spontaneous birth of a large child. When the disproportion between child and pelvis becomes marked, interference is necessary. The head can usually be brought down without much difficulty with forceps, but the shoulders are apt to cause trouble (Derivaux, St. Louis Courier Med., 1891, iv., p. 59). According to Jacquemier (Charpentier) the arrest of the shoulders during labor may depend on the exaggerated size of the thorax and shoulders, lack of proportion between the body of the fetus and the pelvis, acephalic or anencephalic fetus, and absence of rotation of shoulders from inertia uteri. Many a child loses its life from powerful traction applied to the neck. It will be allowed that at times it is possible to exert a violent amount of traction to the child's neck without tearing the head from the body, and even to see such children survive. But there can be no question that many children are killed by this same procedure, the traction being applied from the head or breech of the child. It is much safer for the child to run the risk of several moments' delay and to wait for labor-pains, or resort to expression, than to make violent efforts at traction. It is true that every moment's asphyxia adds to the danger of intracranial hemorrhage (Jacobi); but, is not the powerful and continued traction to the child's neck an exact counterpart of the forces used in the time-honored method of extinguishing life by hanging?

After the head and neck have been delivered, considerable force can be used by the fingers in the axilla of the underlying shoulder. Even the risk of dislocating or fracturing the humerus should be taken, if the asphyxia is at all threatening, for now the element of time becomes of grave importance. The opposite shoulder can next be rapidly delivered and, lastly, the remainder of the body. In these cases everything should be in readiness for the treatment of asphyxia, so that no time is lost in efforts at resuscitation.

CHAPTER XXVIII.

FETAL CAUSES DURING LABOR—(Continued.)

7. DISEASED STATES OF THE CHILD'S HEAD.

Hydrocephalus was met with fifteen times in 43,545 cases of labor (La Chappelle). According to Merriman it occurs once in nine hundred labors. It consists of cephalic enlargement due to dropsical effusion in the ventricles, membranes, and substance of the brain, with separation of the sutures and fontanelles of the fetal skull. The head may, at times, have a circumference of thirty or thirty-one inches—about five or six inches larger than the adult head. Some women have a habit of giving birth to hydrocephalic children, and syphilis seems to have some etiological influence. As the death of such a child is almost inevitable and not of great moment, the interests of the mother should be chiefly kept in mind. A large proportion of these cases present by the breech, or parts other than the vertex (Scanzoni). In sixty cases Chassinat found forty-one deaths before or during labor, eight deaths before the age of four months, and four children lived longer than four years. Only in spontaneous births can infants survive. If the diagnosis can at all be positively determined, forceps should be resorted to; and, if they fail, craniotomy must be conceded as justifiable.

Ossification of the Cranial Sutures may cause difficulty during child-birth. The writer met one case which presented by the vertex in a laterally flexed position. By manual interference it was readily converted into a vertex presentation. There are, however, few cases on record in which labor was solely obstructed from this cause alone.

Encephalocèle consists of a congenital tumor of the cranium or face—usually associated with brain lesions—and is composed of a diverticulum of brain covered by membranes and contains cerebral fluid. Larger has collected ninety-eight cases (Charpentier), and it is said to occur once in 4,000 or 5,000 labors. As these tumors may

give rise to dystocia, it becomes necessary at times to puncture them previous to death.

Literature Concerning Diseased States of the Child's Head.

Hopkinson: Labor Complicated by Congenital Hydrocephalus; Med. News, 1892, lxi. 150.

Evans: Dystocia due to Hydrocephalus; Montr. Med. J., 1893–4, xxii. 115.

Mon: Embryotomy in Hydrocephalic Fetus; Rev. di Obst. e Ginec., 1890, i. 433.

Varnier: Fetal Diseases and Dystocia; Rev. Prat. d'Obst. et d'Hyg. de l'Enf., Paris, 1890, iii. 161.

Brothers: Ear Presentation (Premature Ossification of Skull); Am. Gyn. Journ., Jan., 1892.

Boardman: Dystocia from Intra-Uterine Hydrocephalus; Homeop. Journ. Obst., 1891, xiii. 206.

Bejan: Hydrocephalus causing Rupture of Uterus; Bul. Soc. de Méd. et Nat. de Jassy, 1891–2, v. 50.

8. Diseased State of the Child's Neck and Body.

Tumors of the fetal neck may obstruct labor. Strassman recently reported a case in which the fetus presented by the breech. After the body was born to the navel it refused to come down further, and examination revealed a tumor which, on puncturing, allowed about twenty-five ounces of liquid to escape. After this delivery was easy, and the child lived twenty minutes. The tumor proved to be a hygroma colli, or congenital cyst, of the neck.

Charpentier refers to three cases of *hydrothorax* which caused difficulty during labor. *General anasarca, general emphysema, ascites* or *effusion in the peritoneal cavity*, may similarly obstruct delivery. At least fifty cases of anasarca complicating labor are on record (Charpentier). In recent literature a number of cases have been reported by Dührssen, Raineri, and others. In one case the peritoneal effusion in a seven-months' fetus was associated with a circumference of sixteen inches at the navel. These cases are usually associated with inflammatory lesions of the peritoneum or of the abdominal organs.

Overdistension of the fetal bladder may similarly obstruct labor and require puncture to enable the completion of labor; Rayner, Schwyzer, and Walther have recently reported such cases. In Schwyzer's case—a seven-months' fetus—forceps were applied, the head, the arm, and scapula torn off, and the abdominal wall bored through by the finger, in order to allow over ten pints of urine to escape. The

circumference of the child's abdomen was estimated to be twenty-six inches. Schroeder has reported twelve cases. The prognosis for the child is fatal, only one child having reached the age of five days.

Enlargement of the fetal viscera may obstruct delivery. In one case of cystic degeneration of the kidneys, the abdomen measured eighteen inches in circumference, and the child had to be partially eviscerated (Fussell). Other enlargements may be due to fibro-cystic degeneration of a retained testicle; enlargement, tumor, or hernia of the liver, uterus, pancreas or spleen; one fetus enclosed within another; aneurism of the aorta; the various forms of monstrosities; and all sorts of tumors—cystic, fatty, vascular, cartilaginous, osseous, carcinomatous, spina bifida, ectopias, hernias, hydatid cysts, and encysted neoplasms (Lusk). Besides these we may occasionally meet with ano-perineal tumors—of which one hundred and sixty-five cases have been collected (Charpentier)—originating from the spinal canal, degeneration of Luschka's gland, sacral hygroma, coccygeal and sacral fibroma, cysts, fibroma, cysto-carcinoma, hydrorrhachus, lipoma, and adult tumors (Charpentier). Two cases of umbilical hernia in the newly-born were recently reported by Berger. They were successfully operated on the second and fourth days after birth. The writer recently observed a case of spontaneous eventration at birth. Besides these enlargements the fetus may obstruct delivery by having anchylosis of the joints, adhesion of the extremities to the trunk or to one another, and rigor mortis.

Literature Concerning Diseased States of the Child's Neck and Body.

Berger: Umbilical Hernia in Newly-born Children; Centr. f. Gyn., 1894, xxv.

Bagot: Dystocia due to Cyst in Liver of Fetus; Dublin J. Med. Sc., 1892, xciii. 265.

Strassman: New-born Child with Cystic Tumor of Neck; Ztsch. f. Gebtsk. u. Gynäk., 1894, 200.

Fussell: Cystic Degeneration of Fetal Kidneys; Med. News, 1891, lviii. 40.

Rayner: Obstruction to Delivery due to Distension of Fetal Bladder; Br. M. J., 1892, ii, 1384.

Schwyzer: Obstruction due to Distension of Fetal Bladder; Arch. f. Gyn., 1892, xliii. 333.

Walther: Dystocia due to Distension of Fetal Bladder; Ztsch. f. Gebts. u. Gyn., 1893, xxviii. 333.

Dührssen: Abnormal Peritoneal Effusion in Seven-months' Fetus; Zetsch. f. Gebts. u. Gyn., 1891, xxi. 484.

Rainerl: Dystocia due to General Œdema of Fetus; Gaz. Med. di Torino, 1892, xliii. 21.

Brothers: Intra-Uterine Rupture of the Anterior Abdominal Wall, etc. N. Y. Med. J., 1895, lxii. 707.

9. CONSTITUTIONAL DEBILITY OF THE FETUS.

In certain cases in which the mother has been the subject of chronic diseases—as tuberculosis, pernicious anemia, syphilis, carcinoma, etc.—or has suffered from persistent vomiting, cholera, typhoid fever, or other debilitating diseases, the nutrition of the fetus will often be seriously interfered with. Many of these children die during pregnancy, or are delivered prematurely. In other cases the state of their vitality is reduced to such a degree that they are unable to withstand the strain of an ordinary labor. Such children may be felt up to the time of labor, and their heart-sounds readily discovered with the stethoscope. Still, after the completion of labor, they will be still-born, and no amount of effort will succeed in resuscitating them. The treatment must naturally be of a preventive character, and employed during the period of pregnancy, according to the indications.

CHAPTER XXIX.

INFANTILE MORTALITY DUE TO FETAL CAUSES.

c. DIRECTLY FOLLOWING LABOR.

Physiology of the new-born child.—Up to the time of birth the fetus is in a condition of apnea. The blood circulates through all portions of the body, but the lungs receive a small supply. From the left heart the blood passes into the aorta directly, to supply chiefly the upper portion of the body, and, to a lesser extent, the lower portion. From the right heart the blood passes into the pulmonary artery, and thence the greatest portion empties itself into the aorta through the ductus arteriosus. As proved by the experiments of Zweifel and Fehling, respiration is carried on at the placenta, where a diffusion of gases takes place. Through the medium of the umbilical arteries and vein the carbonated blood is replaced by oxygenated blood in the fetal circulation.

The first inspiratory effort after birth has been attributed to numerous causes. The oldest theory has ascribed it to the change of temperature—which is usually thirty degrees or more—and is supposed to act on the surface of the child. Preyer and others strongly advocate the theory of peripheral irritation. Lahs calls attention to the sudden or excessive squeezing of the placental blood-channels—due to uterine contraction—through the umbilical vessels toward the fetal heart during or shortly following the birth of the child. Runge and the majority of recent writers believe that the disturbance in the exchange of gases between mother and child and the resulting non-aeration of the fetal blood alone interfere with the existing apnea and cause the first effort at inspiration. It is only fair to add that, after a large series of experiments, Heinricius was forced to the conclusion that all the theories are untenable.

With the first inspiration a number of changes occur in the fetal system. The pulmonary alveoli become filled with air, the lungs expand and assume the function of oxygenating the blood and remov-

ing the carbonic acid gas. The whole mass of blood, instead of one-fourth part, must now pass from the right side of the heart into the lungs, and, after oxygenation, return to the left heart for distribution throughout the entire body. The ductus venosis, foramen ovale, ductus arteriosus, and the umbilical arteries and vein, become practically obliterated. The left ventricle undergoes hypertrophy, the blood-pressure in the aorta sinks, the extra-abdominal portion of the hypogastric arteries ceases to pulsate, and the umbilical vein becomes emptied of its blood through thoracic aspiration. The first breath excites an afflux of blood to the lungs, and a negative pressure develops, which acts as a suction force upon the placental blood, and this continues until the circulatory equilibrium is established (Budin). The retracting and contracting uterus also tends to compress the placenta so that, after the birth of the child, more blood is driven into the circulation (Schücking).

Shortly after birth the meconium is discharged, and in a few days feces appear in the intestinal tract. The pancreas and stomach yield secretions which have the property of emulsifying fats and digesting albumenoid substances—thus rendering the assimilation of milk possible. The kidneys begin to excrete urine of a low specific gravity. New-born children are said to lose seven or eight ounces during the first two or three days, and the original weight at birth is only reached between the fifth and eighth days. This loss in weight is said to be greatest in children of primiparæ, in artificially nourished children, and in such children in whom the umbilical cord has been ligated immediately after birth. Budin claims that the amount of placental blood which enters a child's circulation by delaying umbilical ligation is three ounces more than when the cord is immediately tied. According to physiologists the entire quantity of blood averages one-twelfth to one-fourteenth of the total body weight (Kirke). Therefore in a seven-pound baby, whose entire blood weighs only nine ounces, this must mean a great deal. Schücking, who believes immediate ligation of the cord unjustifiable in any case, observed that by delay new-born children gained one to three ounces more in weight than those in which the cord was immediately tied. Winkler advises delay until after birth of the placenta, making use of uterine massage. There is, however, no use in forcing matters. In one case, after the placenta had been delivered, its contents were forcibly squeezed into

the circulation of the child, causing its death from cardiac over-distension. Some claim that there is a disposition to icterus in children in whom the cord was ligated after the placental circulation had ceased. In eleven careful observations of late and early ligation by the writer, only one case developed jaundice, and that was in a child whose cord had been rapidly ligated. As for the occurrence of dark vomiting, melena, and sanguineous vaginal discharges, said to occur after late ligations (Porak), Lusk very properly doubts the relationship. The writer in eleven successive cases tied the cord immediately or after ten or fifteen minutes. The child was weighed at birth, and again at intervals varying between sixty and eighty-four hours later. The increase or decrease in weight was noted. The following tables show the results:

I. IMMEDIATE LIGATION OF THE UMBILICAL CORD.

No.	Weight at Birth.	Weight after 60 to 84 Hours.	Loss or Gain.
1	10½ pounds.	10 pounds.	Loss, ½ pound.
2	8 "	8¾ "	Gain, ¾ "
3	9 "	8¾ "	Loss, ¼ "
4	8 "	9 "	Gain, 1 "
5	9 "	8¾ "	Loss, ¼ "
6	11½ "	11 "	Loss, ½ "

II. DELAYED LIGATION OF THE UMBILICAL CORD.

No.	Weight at Birth.	Weight after 60 to 84 Hours.	Loss or Gain.
1	7 pounds.	8 pounds.	Gain, 1 pound.
2	7½ "	7 "	Loss, ½ " (prem. child)
3	9¾ "	9 "	Loss, ¾ "
4	8¼ "	8½ "	Gain, ¼ "
5	6 "	6 "	Gain, 0 "

These tables show that in the cases in which the cord was rapidly ligated, the average gain in weight after sixty to eighty-four hours was a fraction of a pound. In the cases in which there was delay in tying the cord the children neither gained nor lost at the end of this time. The writer appreciates that these results fail to correspond with those of Budin, Schücking and others, but gives them for what they

are worth. The most serious objection to their value lies in the fact that the number of observations is too small to draw deductions from. But if a large series of observations should confirm these findings, it will practically make little difference whether the cord is delayed in tying or immediately tied. The fact, however, that the child acquires more blood in its system by waiting is sufficient ground for delaying somewhat the tying of the cord. Whether it is necessary for the welfare of the child to wait until after the placenta has been expelled is strongly doubted by the writer.

The frequency of the fetal heart-beat changes directly after birth. In a number of observations the writer found the pulse at the umbilical cord to vary between one hundred and sixty and one hundred and eighty per minute. After waiting ten minutes the pulse was again counted, and found to have dropped to one hundred and forty-five or one hundred and fifty beats per minute. This pulse acceleration immediately following birth is unquestionably the direct result of labor-pains on the placental circulation, and again emphasizes the necessity of watching the fetal heart during protracted labor.

Literature Concerning the Physiology, etc., of the New-Born.

Fehling: On Exchange of Gases between Mother and Child; Arch. f. Gyn., 1876, ix. 313.

Zweifel: Placental Respiration; Arch. f. Gyn., 1876, ix. 291.

Laiis: Studies in Obstetric Science; Arch. f. Gyn., 1872, iv. 311.

Wiener: Influence of the Time of Umbilical Ligation; Arch. f. Gyn., 1879, xiv. 34.

Kirke: Handbook of Physiology, 1885, i. 64.

Winkler: Studies of the Human Placenta; Arch. f. Gyn., 1879, xiv. 239.

Prever: The First Inspiration; Ztsch. f. Gebts. u. Gyn., 1882, vii. 241.

Schücking: Placental Circulation after Birth of Child; Berl. Klin. Woch., 1877, i. 5.

Runge: The First Breath; Ztsch. f. Gebts. u. Gyn., 1881, vi. 393.

Heinricius: Causes of the First Breath; Ztsch. f. Biolog., 1890, xxvi. 136.

Illing: Inaug. Dissert., Kiel, 1877 (on forcible expression of placental blood into fetal system.)

CHAPTER XXX.

FETAL CAUSES FOLLOWING LABOR—(Continued.)

ASPHYXIA NEONATORUM.

We include this subject under the heading of infantile mortality following labor, because, although respiration is absent, the heart, in the majority of cases, continues to act more or less feebly.

Asphyxia of the new-born has been defined to be an abnormal condition in which an obstruction exists to the absorption of oxygen and elimination of carbonic acid gas. This results in a series of symptoms, the most prominent of which is the absence of respiration (Runge). The child's normal condition in utero is one of apnea. If from any cause, during intra- or extra-uterine life, the supply of oxygen is cut off, the fetal medulla becomes gorged with non-oxygenated blood, and the inspiratory movement is excited. After birth this is the normal condition of affairs. Previous to birth, such interruption of the fetal circulation—due to compression of the umbilical cord, separation of the placenta, etc.—is likewise followed by the attempt to respire; but, instead of air, the child draws mucus, blood, liquor amnii, meconium, etc., into its air-passages. The irritability of the medullary centre diminishes, the respiratory movements are lessened, the heart becomes paralyzed and the fetus dies unless speedily delivered. If delivered with the heart still perceptible, if ever so faint, the condition is called "suspended animation" (Lusk), or intra-uterine asphyxia.

Experiments on animals have proved that the asphyxia of the new-born depends less on the excess of carbonic acid gas in the blood than on the absence of oxygen. This view is adopted by such authorities as Schroeder, Lusk and Runge.

If the interference with placental respiration is only temporary, Schultze claims that the disturbance of the fetal functions due to intra-uterine respiration may be equalized or compensated for in the following manner. After a time the medulla no longer receives arterialized blood, its irritability diminishes, and respiratory efforts cease. Blood

can no longer pass from the right ventricle into the pulmonary circulation. The action of the heart is restored, and if the obstruction is only temporary, the interchange of fetal and maternal blood at the placenta is restored.

Post-natal asphyxia occurs in those children born with blood sufficiently oxygenated, but who are unable to institute pulmonary respiration from congenital debility, prematurity, disease, or pathological states. Some children who do not respire prematurely may be born asphyxiated from slow interference with placental respiration in utero. The amount of oxygen in the fetal blood gradually diminishes, but is at first so trivial that the respiratory centre is not stimulated. When, finally, the deficiency becomes marked, the irritability of the medulla has become so depressed that it is incapable of originating a respiratory impulse. In these cases fetal death, or birth in the condition of asphyxia, occurs without any intra-uterine efforts at respiration (Dohrn).

Etiology and Pathology of Asphyxia Neonatorum.—In the intra-uterine variety of asphyxia the cause of the trouble may emanate from the mother, fetus, or appendages. Compression of the fetal brain from contracted pelvis or the use of forceps may interrupt the placental interchange of gases. Compression of the umbilical cord and separation of the placenta will act directly in interrupting the fetal circulation. Maternal causes may be due to heart or lung disease and any condition resulting in lowering of the blood supply with diminished placental nutrition.

The pathological conditions, in these cases, may be due, 1, to the asphyxia itself, or, 2, to the fact of premature respiration (Runge). The asphyxiated state may be responsible for the liquid state of the blood with engorgement of the right side of the heart, large thoracic vessels, sinuses of the dura mater, blood-vessels of the pia mater, and, particularly, of the liver. Bloody extravasations are met with in the various internal organs, pia mater, pleura, peritoneum, liver, retro-peritoneal connective tissue, kidneys and their capsules, uterus and retina. A case of ruptured hematoma of the liver, in such a case, has, during the past year, been reported by Negri. The pericardial and pleural cavities, in slowly developed cases, may contain blood-stained serum. There may be œdema of the pia mater, scrotum, and connective tissue surrounding the umbilical vein.

From the fact of premature respiration, the trachea and bronchial tubes may be filled with various substances—mucus, amniotic fluid, meconium, vernix caseosa, hairs, epidermis, and fat-cells. The presence of such foreign substances proves the occurrence of intra-uterine respiration. In rare cases foreign bodies may be absent when the nose and mouth have been occluded by the membranes or close apposition to the maternal parts (Lusk). Liquor amnii has been found in the middle ear (Spiegelberg). The stomach may contain air or meconium prematurely swallowed. There may be areas of ecchymoses beneath the pleura and pericardium. Occasionally some air is present in the bronchi. Pulmonary ecchymoses are less frequently met with in intra-uterine asphyxia than in the post-natal variety, but congestion and extravasations in the abdominal and cerebral organs occur with about equal frequency.

The post-natal form of asphyxia consists of a persistence of the normal intra-uterine apnœa after birth. It may depend on malformations, prematurity, or disease of the fetus. Malformations or disease may involve the organs of circulation and respiration, or the nervous system. Pulmonary syphilis (white hepatization), double pleuritic effusions (Spiegelberg), compression of the air-passages, imperfect development of the lungs, defects of the diaphragm, with hernia of stomach and intestines in the pleural cavity (v. Dittel), injuries to the respiratory centre due to labor or instrumental interference, or any condition resulting in a high grade of brain-pressure sufficient to paralyze this centre, and by irritation of the pneumogastric, arrest heart-action—have all been found sufficient to prevent respiration after birth. In the prematurely-born fetus the undue softness of the costal cartilages, combined with the weakness of muscles and nerves, prevents expansion of the thorax. Hence, from all these various causes, the fetal condition of pulmonary atelectasis persists after birth. Even after resuscitation many of these children die after several hours or days.

In this variety of asphyxia the evidences of premature respiration are absent. General atelectasis and various lesions will be discovered post mortem. Even in resuscitated children the degree of atelectasis found will be striking. This fact was pointed out early in this essay. It proves that the snapping inspiratory movements which these children make are of little service in aerating the lungs. Besides

atelectasis, the lungs are large, heavy, and of a dark red color. In those which have breathed, pulmonary congestion and ecchymoses may be absent, and isolated areas of acrated tissue present. As a rule, the posterior portion of the lower lobes are said to be unaerated. Pneumonia is very rare. In twenty-four autopsies in premature children, Runge found pneumonia complicating atelectasis in only two cases. The blood, in this class of children, is dark and uncoagulated. The pulmonary vessels are widely distended. Pulmonary extravasations are said to be more extensive than in cases of asphyxia accompanied by intra-uterine respiration, for the reason that, in the latter, the aspirated fluids offer a certain support to the distended capillaries (Lusk). Obstruction to pulmonary circulation may result in venous congestion of the surface and abdominal organs, giving these children their dark blue color. The same cause may be responsible for the various hemorrhages—conjunctival, meningeal, cerebral.

If the child only died after several days, besides the evidences of imperfect pulmonary aeration, there may be present jaundice, extreme inanition, and œdema of various parts. Occasional bloody extravasations may be found in the brain and other parts. Urate infarctions are said to occur with greater frequency in premature children than in those born at term.

Signs of Asphyxia.—From experiments on animals five signs have been decided on as determining the advent of asphyxia previous to birth. They are: 1, dyspnœa due to premature efforts at inspiration, followed by paralysis of respiration; 2, increase of fetal blood pressure, followed by its diminution; 3, diminished, and later increased frequency of the heart-action; 4, increase in intestinal peristalsis; 5, spasmodic contractions of fetal parts (Runge).

Of these five signs during labor only one or two are practically available: 1, changes in the fetal heart-action, and 2, increased intestinal peristalsis with premature escape of meconeum. As this latter condition may follow the use of quinine, or occur normally in breech presentations, we are reduced to the one sign—change in the fetal heart-action.

This again emphasizes the necessity of watching the fetal heart by means of a stethoscope during the progress of labor. Absence of heart beat does not prove conclusively the death of the child. But, if heard distinctly at first and later feebly or not at all, the presump-

tion is strongly in favor of impending death of the child. Attention has been called to this fact a number of times in this essay, but important truths bear constant repetition. More than thirty years ago v. Hüter made an excellent study of the fetal pulse in two hundred pregnant women. He proved the average normal pulse to be one hundred and thirty-two per minute, and, at times, to become so accelerated by fetal movements as to defy counting. In maternal febrile affections he found the pulse to become continually rapid and, in certain affections, as cholera, to become distinctly intermittent. During hemorrhages he found that it might disappear altogether. He pointed out that, at the beginning of labor, a rapid increase in the fetal pulse was temporary, and only indicated active movements on the part of the child; toward the end of a protracted labor, however, the same increased pulse-rate was a fairly safe indication of approaching fetal death. During labor-pains diminution in the frequency of the fetal heart-beat is normal. To be of value from a diagnostic stand-point, the slowing of the fetal pulse must occur in the intervals between pains and be progressive in character. It then indicates brain-pressure or irritation of the medulla through excess of de-oxygenated blood. Succeeding this, an increase in the fetal heart-beat betokens paralysis of the pneumogastric and, consequently, a more advanced stage of asphyxia. Delivery must now be accomplished at once if the child is to be saved.

The evacuation of the child's bowels—except in breech cases when direct pressure exerts an influence—is due, in part, to relaxation of the sphincters and contraction of the diaphragm, but chiefly to the increased intestinal peristalsis attendant upon asphyxia.

By abdominal auscultation and vaginal touch the "intra-uterine cry," or fetal dyspnœa, has been detected by various observers (Schultze, Kristeller, Boehr). Exceptionally, if the head is low down, it may be possible, with the finger in the rectum, to recognize premature inspiratory efforts (Runge).

The muscular contractions have occasionally been met with in pelvic births. The writer recalls a number of instances in which spasmodic movements followed by quietude on the part of the fetus occurred in cases in which dead children were born.

CHAPTER XXXI.

FETAL CAUSES FOLLOWING LABOR—(Continued.)

Symptoms of Asphyxia Neonatorum.—These may be divided into two sets of cases—those occurring in intra-uterine and post-natal asphyxia. To distinguish between these two varieties of cases after delivery, the detection of bronchial râles will usually be possible in cases in which intra-uterine respiration has occurred.

In intra-uterine asphyxia, directly after birth, although the heart-sounds are perceptible, respiration will be absent or feeble and accompanied with râles, the eyes will be closed, and the extremities will hang motionless and limp. Presently the surface will become cool, the respiratory efforts cease, and, finally, the heart-beats disappear. The cases may be mild (asphyxia livida) or severe (asphyxia pallida), the dividing line being marked by a loss of tone in the muscular system. In mild cases, the skin will vary in color from deep-blue to blue-red; the features will be puffed and show a painful expression; the conjunctivæ will be injected, with the eyes closed or eyeballs protruding, and the extremities will hang motionless. In severe cases, the complexion will be as pale as wax; the lips will assume a light-blue color; the extremities, head and lower jaw will be loose and flaccid; the sphincters will be relaxed, and the entire appearance of the child will be corpse-like. In milder cases, although the limbs are motionless they are not flabby, and their muscular tone will be preserved so that reflex movements can readily be induced by surface irritation; in severe cases the muscular tone will be entirely absent and no reflexes can be elicited. The heart-action in mild cases will be slow but forcible; in severe cases it will be rapid and feeble. The umbilical vessels will be distended with blood and pulsate strongly in mild cases; whereas, in severe cases the cord will be collapsed and only occasionally pulsate. The respiration in mild cases will be absent or, if feebly present, accompanied with facial, nasal and maxillary action; in severe cases the respiration will be absent, or if

present will, in spite of apparently powerful diaphragmatic contraction, admit little air in the lungs. In the former cases respiration will progressively become stronger; in the latter it may become feebler and soon cease. These respiratory efforts will likewise be marked by an absence of facial contraction. In mild cases efforts at resuscitation may not be required, or will succeed readily, or the child may pass into the second stage. In severe cases the same efforts may prove futile.

The symptoms in post-natal asphyxia during labor are negative. Intra-uterine asphyxia will be excluded by the absence of any change in the frequency of the heart-sounds. Absence of râles after birth will confirm the diagnosis. The asphyxiated state may manifest itself by complete absence of respiration, or a few snapping respiratory efforts accompanied with thoracic retraction. These may soon entirely cease, or continue as an irregular sort of respiration for hours or days. The child may start from its apathetic condition at various intervals and again fall back into its state of torpor. The umbilical vessels are usually well filled with blood and pulsate. The heart-beat is at first normal, later slowed, and finally accelerated. The surface and extremities are reddish-blue, and quickly become cool.

These children die very quickly if there is an error of development or disease of the respiratory organs. Diaphragmatic hernia in young infants has been diagnosticated by excessive rapidity of the respiratory movments (Jacobi), although v. Dittel's case of post-natal asphyxia made no effort at respiration. The truth of the matter is, that the autopsy must be relied on for the positive diagnosis.

Insufficient development accounts for the inability to expand the lungs in premature children. The respiration is feeble, of an occasional snapping character, and marked usually by an absence of râles. The apathetic condition is relieved by periods of soft whining. The skin is reddish-blue, the features turbid, and the surface cold. Œdema of hands and scrotum is occasionally present. Physical examination may reveal dulness at the base of each lung and faint respiratory murmurs. Efforts at nursing are absent or feeble. Jaundice may develop after several days. Rectal temperature is sub-normal. Loss in weight is rapid. A frequent and unfavorable complication preceding death is sclerema.

Differential Diagnosis.—The intra-uterine variety of asphyxia may require differentiation from apnea, anemia, or pressure of the brain. Although Schultze denies the possibility of persistent apnea, Kehrer is a strong believer in its occurrence. Failure to respire, with absence of râles, makes the diagnosis of apnea probable, but beginning respiration alone can absolutely establish the diagnosis.

Anemia of the newly-born may be due to rupture of the blood-vessels of the umbilical cord in cases of insertio velamentosa (Runge). These children may present signs of the second grade of asphyxia, and show the presence of aspirated substances in the air-passages.

Asphyxia due to brain pressure—from hemorrhage, depressed bone, or forceps—is of grave importance. Large hemorrhages in the brain substance cause rapid death. Surface hemorrhage may give rise to symptoms closely resembling asphyxia—slowing of the pulse, absent or superficial respiration; but no foreign substances will be present in the air-passages. Contracted pelvis may cause both asphyxia and cerebral pressure. Thus brain-pressure may slow the pulse, lessen the interchange of gases in the placenta, and induce asphyxia as a secondary result (Schultze). Premature children often present this combination of cerebral hemorrhage and asphyxia. The character of the labor, narrow pelvis, and operative interference will point toward the combination. Such a child, when roused, will rapidly relapse into a somnolent state. The pulse will be slow and full, the respirations irregular, and the general appearance one of mild asphyxia.

The prognosis after asphyxia, during the first eight days of life, is seven times worse than that of children born unasphyxiated (Poppel). The death-rate is in direct proportion to the duration of the asphyxia. Thus children born with coils about the neck or in whom the asphyxia is prolonged from any cause, are apt to have hemorrhages of greater or less extent in the brain. Many cases of idiocy and epilepsy have been traced to asphyxia (Jacobi). Langdon Down refers to the influence of forceps and asphyxia in producing idiocy. Little has collected two hundred cases of spastic rigidity resulting from asphyxia.

The length of the expulsive period of labor, the size of the pelvis, the nature of the presentation, the use of forceps or version, or compression of the umbilical cord, all have a bearing on prognosis. Intra-

uterine asphyxia offers a grave prognosis on account of the presence of foreign substances in the air-passages. When the nose and mouth have been occluded the prognosis is worse, because pulmonary extravasations are more apt to be present (Lusk). The first grade of asphyxia offers a good prognosis; the second grade is more doubtful. The snapping respirations are apt to be misleading, and it is well to bear the advice of Schultze in mind, to avoid long-continued asphyxia and to never be satisfied with partial resuscitation. Aspirated foreign substances interfere with efforts at artificial respiration and tend to excite atelectasis and broncho-pneumonia. Brain-pressure renders the prognosis serious. Therefore asphyxia, after vertex presentation, is more grave than after-breech presentation (Runge). Hemorrhages of the convexity of the brain are less dangerous than those at the base. Small extravasations may become absorbed. The writer had a case of prolonged asphyxia following a very difficult instrumental delivery, in which the child had repeated convulsions during two days, and the diagnosis of traumatic cerebral hemorrhage was made. This child made a rapid recovery, and after a year was in perfect health. Still, in such cases, the risk of subsequent epilepsy or idiocy is considerable.

In cases of post-natal asphyxia the prognosis depends on the cause. Errors in the development of lungs, heart, diaphragm, etc., offer the gravest prognosis. Intra-uterine disease is apt to mar the prognosis. In cases of brain-pressure or injury to the medulla the prognosis is bad. Poppel claims, however, that meningeal hemorrhages never cause death directly from pressure on the medulla, but that they interfere with respiration, and give rise to coma. In cases of premature birth the prognosis depends primarily on the age of the fetus, and, secondarily, on the intelligence of the parents and the amount of care which can be bestowed on the infant. The occurrence of sclerema neonatorum very materially dampens the prognosis.

CHAPTER XXXII.

FETAL CAUSES FOLLOWING LABOR—(CONTINUED.)

Treatment of Asphyxia Neonatorum.—Prophylaxis should be observed in every case of labor, and every preparation should be on hand for possible asphyxia. The character of the labor and the fetal heart-action must be carefully supervised, and at the first evidence of danger to the child it must be delivered as rapidly as is consistent with maternal safety. As the dangers of asphyxia arise chiefly from lack of oxidation of the respiratory centre, lethargic state of the fetal circulation, and, in intra-uterine asphyxia, from blocking of the air-passages, the indications for treatment are sufficiently clear. The air-passages must be cleared and the activity of the medullary and cardiac functions restored by artificial respiration. Above everything else, systematic interference is requisite. Nothing is worse or more common than jumping from one method to another. Cold water dashed on the child, followed by hot, and again by cold over bedclothes and everything, then friction and a few Sylvester movements made hastily and imperfectly, can only be of service in the mildest cases, but may force aspirated liquids further into the child's air-passages or chill the baby. Method, as in everything else, is indispensable.

When asphyxia is expected, and in all cases where a good nurse is at hand, it is well to have a number of things in readiness previous to the birth of the child, for time is of great moment in these children. On a chair or table a pillow covered with rubber cloth and a warmed napkin is placed, and will serve as the operating table. A bath-tub containing hot water, a pitcher of cold water, and another containing hot water, scissors, string, a number of warm napkins, and a thin elastic catheter (eleven or twelve Fr.) will be all that is necessary.

On the birth of the child it is well to at once proceed to diagnosticate the grade and variety of the asphyxia while removing the

mucus from the child's throat with the little finger. If the gums react and the finger excites choking or swallowing the case belongs to the first grade of asphyxia, because the reflexes are still present. If no reaction follows the second grade is present.

In all cases of asphyxia it is well at once to tie the cord in two places, cut between the ligatures, and place the child on the operating pillow. Some authorities advise against ligating the cord (Lusk). Others advise allowing blood to escape. But these measures rob the child of blood, or cause the child to lie in wet and unhandy surroundings. The advantages, if any, are not sufficient to counterbalance the comfort and ease which the operator enjoys by having the child entirely away from the bed.

In the first grade of asphyxia, after removing the mucus from the child's throat with the finger or sucking it up through the catheter in the larynx, the child is thrust into a warm bath. The water must neither be too hot nor too cold. These children have emerged from surroundings having a temperature corresponding to blood-heat (about 100° F.), and the bath ought to approach this temperature. The child should be next placed on its pillow and rubbed dry with warm napkins. This process is repeated—bath, rubbing and removal of mucus. If after the second time there is no response, or only an imperfect result, cold water with the hand should be poured over the child, or it should be submerged in a bath of cold water immediately followed by the warm bath, and then dried. If deep inspirations followed by a cry are still absent repeat this process several times—cold bath, hot bath, rubbing, and removal of mucus (Runge). Flaggellation of the nates, rubbing the soles of the feet with a stiff brush, brandy applied to the epigastrium or poured into the throat, may be tried. Laborde recommends forcible rhythmical traction of the tongue. Mild cases will usually respond to these measures, but they must be persisted in for a half hour or longer until the child has a healthy appearance.

In the second grade of asphyxia the finger in the throat has failed to induce reflex movements, and external irritants, therefore, are of little use. The main object of treatment is to bring oxygen to the medulla. In doing this it must never be forgotten that the air-passages may be filled with foreign substances which must first be removed or expelled previous to admitting air into the lungs. Nobiling and others state that even a slight obstruction in the air-passages is sufficient to

prevent air from entering the lungs. Hence whatever plan be followed it must be remembered that the movement of expiration must precede that of inspiration. Some authors prefer the method of introducing a catheter into the child's larynx; others select the Sylvester or Schultze method. Lahs, after a series of experimental investigations, arrived at the conclusion that the largest amount of air could be introduced into the lungs of asphyxiated children only by the methods of Schultze and Sylvester or their modifications. It is well for the accoucheur to be thoroughly and practically acquainted with all the methods.

One of the easiest methods to learn and one of the most universal in its application and accompanied with the least risks of damage to the feeblest children, is the old Sylvester method described as long as forty years ago. The writer has conscientiously resorted to the various newer methods, and, while recognizing their usefulness in selected cases, he is firmly convinced that they offer no advantages over this method, and, in careless hands, offer many more dangers to the child. Sylvester's method may be resorted to in the first grade of asphyxia when the recommended measures have failed, or, in any case, after wrapping the child in a warmed napkin after cleansing the throat of mucus, and directly after tying the cord. The child, wrapped in a warmed napkin, is placed on its back with the shoulders raised, the feet fixed, the tongue drawn forwards, the mucus removed from the throat, and the arms pressed gently and firmly against the sides of the chest to simulate expiration. Now grasping the arms above the elbows they are raised upwards and everted alongside of the head and kept there fully extended for a short time to induce inspiration. By everting the arms Champneys found the effect to be twice as great as when this was not done. The movement of expiration now follows. After several repetitions the child is thrust into a warm bath. The movements are again begun and followed by a warm bath until spontaneous respiration occurs or the case becomes hopeless. Champneys and others, by experimenting on tracheotomized dead children with the aid of the manometer, have found this method to be fully equal to that of Schultze in filling the lungs with air. It avoids chilling the child's body or unintentional injury, as at times happens when the latter method is employed. It has the objection, however, that the dorsal decubitus interferes with the expectoration of foreign substances from the air-passages. The writer partly overcomes this difficulty, during

the movement of expiration, by turning the child on its side. Bain has modified Sylvester's method in the following manner: By placing the hands under the axillæ with the thumbs over the external ends of the clavicles the shoulders are forcibly pressed forwards and then allowed to fall back. With the spirometer he claims to have proved that more air is thus made to enter the lungs. Pacini adds that it is better to draw the arms and shoulders backwards and upwards.

Lusk, Behm, and others think highly of passing the catheter into the larynx. Foreign substances being first sucked up, air is blown into the lungs and this is followed by pressure applied to the thorax. Thus inspiration and expiration are simulated. That this method is not easy, can be inferred from the fact, that, in spite of a large experience in intubating young children, the writer found it impossible, in one instance, to introduce the catheter, and, consequently, instead of into the lungs, the air was blown into the stomach. The dangers to the child from this method are interstitial emphysema, pneumo-thorax (Runge), rupture of the lung (Fritsch), and air in the pericardium (Fritsch). Besides these risks the danger of communicating diseases from the operator's mouth must be borne in mind. Ten children died of tubercular meningitis, after three or four months, in the practice of a tubercular midwife, from the mouth-to-mouth method. Still, in the case of premature children, which can be kept wrapped in cotton or warmed cloths, the catheter offers advantages over the other methods at our command.

The method of Schultze, first described in 1871, has deservedly received recognition all over the world, and is generally in use throughout the German empire. Runge, Wiercinsky, Guelfi, and others have proved that this method is sufficient to force air into the lungs of asphyxiated children. It is applicable to well-developed children born in the second grade of asphyxia. Schultze claims that the movement of inspiration has a mechanical influence on the heart, in that more blood is emptied into the heart from the great veins than from the diastole alone, and thus fresh cardiac activity is excited.

After ligating and cutting the cord, the operator's hands seize both shoulders in such a manner that the thumbs rest on either side of the chest-wall anteriorly, the index fingers rest in the axillæ, whilst the rest of the fingers lie across the back—so that practically the child, with its back toward the operator, swings with the axillæ resting in the

operator's index fingers. In the first movement the child is tossed upwards so that the lower half of its body lies doubled over the upper half. Thus the lumbar spinal region becomes flexed, the head is turned downwards, and the whole weight of the child's body rests on the operator's thumbs. The child's organs, as a result, become compressed, a passive movement of expiration ensues, and the air-passages are cleansed. After a short pause the child's body is swung downwards, the chest expands, and the movement of inspiration occurs. The pectoral muscles, in this movement, draw the superior ribs upwards, the inferior ribs being drawn downwards by the abdominal muscles and the diaphragm on account of the weight of the liver. After several seconds the upward swing is repeated, and then the movements are repeated six or eight times. The child is then immersed in a warm bath and, if necessary, the swingings resumed. Besides admitting air into the lungs, Winkler claims that the Schultze movements allow more blood to gravitate to the brain and assist the circulation and interchange of gases. If successful, the child will pass into the first grade of asphyxia, when alternate hot and cold baths or external irritants may be employed. As long as the heart beats, efforts must persist—swingings alternating with baths. Gibson succeeded in resuscitating a child which he only saw thirty minutes after birth. Even after respiration sets in, efforts must be persisted in until the child presents a vigorous appearance, otherwise these children are apt to lapse into the asphyxiated state and the autopsy after death will show large areas of atelectasis (Runge). The short, snapping inspirations indicate insufficient pulmonary aeration and must not be deemed sufficient. Internally brandy or musk, well diluted, may be given to support the feeble heart.

The objections to Schultze's method are the dangers to the child from striking objects in the room, and violence from careless manipulations in swinging too suddenly or too forcibly, and chilling of the child's body. Winter refers to hemorrhage in the scrotum, fracture of the ribs, and rupture of the liver. Meyer warns against these movements in case of fracture of the clavicle and humerus or other injuries. Kehrer is opposed to the method in children extracted with great difficulty because of the possible aggravation of injuries to the skull, brain, vertebræ, and spinal cord, and because fractures may be displaced and fresh hemorrhages induced. Besides all this, the manip-

ulations are apt to make a bad impression on the relatives and, when fatigued, the operator is not apt to have a trustworthy assistant at hand to resume the movements.

The advantages claimed for this method are, that it cleans out the air-passages, oxygenates the respiratory center, and vivifies the energy of the circulation. Although theoretically better than the Sylvester method in allowing foreign bodies to escape from the air-passages—and even this has been recently denied by Budin—it has no advantages over the latter method in admitting more air into the lungs. In fact Champneys is inclined to give the Sylvester method the first place in this respect. The additional risks of chilling and injuring the child place the method of Schultze, in the writer's estimation, beneath that of Sylvester.

Several other methods are described which may prove of use from time to time. With faradization of the phrenic nerve Pernice (in 1864) succeeded in saving three out of five deeply asphyxiated children. A small faradic battery will certainly induce a deep inspiration, by placing one pole at the side of the neck and the other over the sternum at the insertion of the diaphragm. The writer has had opportunities for testing this fact in several cases of profound asphyxia from illuminating gas and opium poisoning. But, aside from the fact that a battery is not apt to be at hand when wanted, the movement of expiration must be supplied by other methods, and, by the employment of the forced inspiratory efforts alone, foreign bodies may be sucked further down into the air-passages.

The method of Marshall Hall is thus described in the author's words: "Respiration is effected by placing the patient in the prone position, and turning the patient on the side fully, and rather more, alternately. In the former position pressure is made on the thorax and abdomen equal to the weight of the body, and expiration takes place. In the latter, that pressure is removed, and inspiration occurs." This method is considered by most authorities as inferior to the methods of Shultze and Sylvester.

Besides the direct passage of a semi-elastic catheter into the larynx, modifications have been described from time to time. One of the oldest methods consists in placing the operator's mouth over that of the child—a thin cloth intervening—and blowing into the air-passages of the latter. Besides not providing for expiration, this method offers

the objection of forcing foreign bodies deeper into the bronchial tubes and rather distending the stomach with most of the air. Tuberculosis has been communicated to children by this method.

In Forest's method, the child being placed in a vessel of warm water, the head is drawn backwards, causing the cervical vertebræ to be thrown forwards; the hands are drawn upwards, the mouth opens, and air is strongly blown by the operator into the child's lungs. The backward extension of the head is supposed to occlude the œsophagus by the direct pressure of the vertebræ, and thus prevent the entrance of air into the stomach. The expiratory act is induced by throwing the head forward and bringing the arms down to the sides, so as to express the air from the lungs. Unfortunately, the inventor of this method was unsuccessful in the cases in which he resorted to it. It presents, however, a number of good features and deserves further trial. It may be of interest here to note that Howard, in 1881, pointed out that by forcibly extending the head and neck the insensitive epiglottis becomes elevated, and may thus permit air to enter the lungs.

Sharp uses a method of holding the child by the feet with the head and back resting in a downward direction in the other hand, and claims that asphyxiated children can in this manner be brought to gasp. Roberts modifies the method by holding the child perpendicularly head downwards. Goyard saved an asphyxiated child, after spending an hour and a half with other methods, by plunging it into very hot water (50° C.—122° F.).

Instrumental insufflation is often very difficult to carry out. In France instruments have been devised by Chaussier and Depaul, and also by Ribemont. The writer has neither seen nor used these instruments, but, according to Budin, that of Ribemont is said to serve an excellent purpose in these cases.

In the post-natal variety of asphyxia the usual attempts at resuscitation must be made. In case of failure the causes can only be determined by autopsy. In premature children, skin irritants, insufflation, and perhaps the Sylvester method may be tried. The Schultze movements are distinctly contra-indicated. In fact, v. Hoffmann described a case in which no air was found in the lungs of a premature child post mortem, although the Schultze movements were made after birth. In this case the lungs could easily be inflated by blowing.

In these cases it is not necessary to clean out the throat. After introducing air into the lungs by the methods indicated, it is well to give these children two or three warm baths daily, followed by frictions. Where no asphyxia is present, the writer has avoided bathing the children for a number of days, simply looking after the body-heat and nourishment. Where the children lie in a somnolent state, it may be well to wake the baby from time to time and apply light irritants. Nourishment must be given every hour or two by the spoon, if the child is too weak to nurse. The body-heat must be retained by cotton or pillow packings, hot-water bottles, warm-water apparatus or incubators. The child's vitality must be carefully preserved by all the means described in detail in a former chapter.

Literature Concerning Asphyxia Neonatorum.

Negri: Rupture of Liver due to Asphyxia; Central. f. Gyn., 1894, xxxi. 760.

Runge: Diseases of the First Days of Life; Stuttgart, 1893.

V. Dittel: Congenital Defect of Diaphragm: Central. f. Gyn., 1894 (May 19), 488.

V. Hüter: The Fetal Pulse; Monatsch. f. Gebtsk., 1862, xviii. 23.

Kristeller: Pre-natal Respiration; Monatsch. f. Gebtsk., 1864, xxv. 321.

Boehr: Respiration previous to Birth; Monatsch. f. Gebtsk, 1863, xxii. 408.

Schwartz: Brain Pressure and Skin Irritants etc.; Arch. f. Gyn., 1870, i. 361.

Kehrer: Apnœa of the Newly-Born; Virch. Arch., xxxvii. 478.

Poppel: Asphyxia of the Newly-Born; Monatsch. f. Gebtsk, 1865, xxv. 1.

Down & Mitchell: Idiocy, etc., after Forceps; Br. Med. Journ., Feb. 24, 1877 (editorial).

Winter: Asphyxia Neonatorum; Vierteljahrs. f. Gericht. Med., 1887, xlvi. 81.

Frankenhaüser: Observations on the Umbilicus; Monatsch f. Gebtsk. 1860, xv. 368.

Laborde: Treatment of Asphyxia; Central. f. Gyn., 1894, xxix. 712.

Gibson: Prolonged Asphyxia, etc.; Am. J. of Obst., 1884, 1141.

Nobiling: Schultze Movements, etc.; Wien. Med. Woch., 1885, vii. 238.

Lahs: Experimental Investigations; Arch. f. Gyn., 1885, xxvi. 273.

Bain: Modification of Sylvester's Method; Jahresb. d. Ges. Med., 1868, i. 480.

Pacini: Modified Sylvester Method; Jahresb. d. Ges. Med., 1868, i. 480.

Hoffmann: Medico-Legal Studies; Jahresb. d. Ges. Med., 1882, 469; also, 1883, i. 529; also, St. Petersb. Med. Woch., 1887, xx. 164.

Runge: Schultze Method; Berl. Klinic. Woch., 1877, ix. 151; ibid., xviii. 1882, 275.

Oblonsky: Schultze's Method · Vierteljahrs. f. Gericht. Med., 1888, xliii. 348.

Winter: The Gastro-intestinal Test; Vierteljahrs. f. Gericht. Med., 1889, li. 101; also, 1887, xlvi. 81.

Wiercinsky: Schultze Method; Central. f. Gyn., 1888, xxiii. 369.

Guelfi: Artificial Respiration; Central. f. Gyn., 1887, xvi. 261.

Falk: Various Pulmonary Tests, etc.; Berl. Klin. Woch., 1888, xxii. 433.

Schultze: Respiratory and Cardiac Action, etc.; Central. f. Gyn., 1890, vi. 89.
Müller: Tests in Asphyxiated Children; Wien. Med. Woch., 1891, xxxii. 1322.
Winkler: Schultze Movements; Arch. f. Gyn., 1879, xiv. 239.
Ahlfeld: Report of Obstetric Work, etc.; Dent. Med. Woch., 1888, xxviii. 573.
Meyer: Schultze Movements; Centr. f. Gyn., 1890, x. 150.
Champneys: Experimental Researches; Med. Chir. Trans., 1881, lxiv. 41.
Pernice: Asphyxia Neonatorum; Monat. f. Gebtsk., 1864, xxiii. 317.
Behm: Artificial Respiration; Zysch. f. Gebtsk. u. Gyn., 1880, v. 36.
Howard: Tongue Traction in Asphyxia; Br. Med. Journ., 1881, 561.
Hall: New Mode of Effecting Artificial Respiration; Lancet, Mch. 1st, 1856, 229.
Reich: Tuberculosis is Infectious, etc.; Berl. Klin. Woch., 1878, xxxvii. 551.
Sharp: Treatment of Asphyxia; N. Y. Med. Rec., 1886, ii. 10.
Roberts: Treatment of Asphyxia; N. Y. Med. Rec., 1886, ii. 123.
Govard: Asphyxia of the Newly-born; Gaz. des Hôp., 1881, vi. 444.
V. Hoffmann: Schultze Movements; Wien. Med. Woch., 1885, viii. 238.
Eröss: Influence of Temperature, etc.; Ztsch. f. Heilk, 1884, v. 317.
Lesser: Statistics of Tests; Central. f. Gyn., 1890, xxxiv. 601.
Furst: Warming apparatus for Premature Children, etc.; Deut. Med. Woch., 1887, xxxiv. 749.

CHAPTER XXXIII.

FETAL CAUSES FOLLOWING LABOR—(Continued.)

PREMATURITY.

Although directly concerned in this essay with infantile death occurring during labor, it may be well to round up our subject with a brief notice of some of the most frequent causes of the death of the child during the first hours or days of life. Among these causes prematurity ranks foremost in importance and fatality. This subject has been thoroughly entered upon elsewhere, and we shall content ourselves at present with emphasizing the fact that, in this country, premature children are very much neglected, especially in private practice. The laity still firmly believe that eight months' children cannot live and make very little effort to preserve them. Excepting in well-equipped hospitals, the majority of the profession fail to devote themselves with sufficient energy and zeal. In this manner the combined disinterestedness of physician and relatives only serves to allow the flickering spark of the feeble infant to rapidly become extinguished. As previously described, these children require unremitting care and attention. The body-heat must be preserved by various external measures. Systematic feeding at regular intervals, with proper liquid nourishment, must be persevered with until sufficient strength is developed to nurse. The feeding of these immature infants on teas—as is constantly done by nurses and mothers—is wrong. In the absence of mother's milk, properly diluted cow's milk should be substituted.

CEREBRAL HEMORRHAGE.

Cerebral hemorrhages are responsible for a large number of infantile deaths during or shortly following the act of labor. The subject has been referred to a number of times in different chapters. Its connection with tedious labor, deformed pelvis, forceps, and any cause producing fetal brain pressure or interrupting the fetal cerebral circulation, has been sufficiently dwelt upon elsewhere. These hemorrhages

may be cerebral, meningeal or subdural. They may be punctate in character, or occur as extravasations of various sizes. They may be few or numerous. They may be found in the substance of the brain or ventricles, or at the base, or on the convexity. The only symptom at birth may be asphyxia, due to the pressure of the extravasated blood; or, per contra, the persistence of the asphyxiated state in the new-born child may result in cerebral hemorrhage. In the latter case the primary slowing of the circulation is followed by stagnation and finally rupture of the blood-vessels, with escape of blood in larger or smaller quantity (Jacobi). In these cases, however, hemorrhages are apt also to be found in other parts of the body (Runge).

Even after emerging from the asphyxiated state, such children may succumb after several hours or days. According to the size and number of the hemorrhages, these children may lie in a torpid state, or be excessively cross, or develop convulsions of greater or lesser severity. The writer has met one case of convulsions in a new-born child repeated for days, after a most difficult instrumental delivery, which seemed to depend on cerebral hemorrhage, yet the child made a perfect recovery, and is alive to-day. In numerous instances, however, he has been able to confirm the observation of Jacobi and others, that many cases of epilepsy and idiocy could be traced to a probable hemorrhage in the brain occurring during or shortly following labor, especially if asphyxia was prolonged, or a coil of the umbilical cord strangulated the child's neck.

The indications for treatment are preventive in the main. During labor prolonged brain pressure should be avoided as much as possible. Impacted children must be delivered as quickly as possible. Forceps and other operative measures must be employed with care. Coils about the neck, if too tight, must be quickly loosened or, at times, cut between ligatures, without waiting for the delivery of the rest of the body. Systematic efforts at resuscitation from the asphyxiated condition must be made without delay.

INJURIES TO THE HEAD AND FACE.

As a rule a certain amount of pressure occurs in all cases during labor resulting in the caput succedaneum, which consists of an exudation of serum due to passive local congestion. When excessive a real hematoma may result. Braun recently reports a case of hematoma

of both parietals complicated with melena (Centralbl. f. Gyn., 1894, xvii. 414). Fractures of the skull may occur spontaneously in small pelves with strong labor-pains, but, in the larger number of cases, they are due to mechanical interference, such as the use of forceps. These children are apt to be excessively cross after birth, and occasionally the symptoms of brain pressure, due to depressed bone and complicating sub-cranial hemorrhage, are present.

The extra-cranial injuries—hematomata and lacerations of the scalp—require little treatment; the former are best left severely alone, the latter are subject to ordinary surgical principles. Fractures, in many cases, regulate themselves, the fetal cranial bones possessing the power of self-adaptation to a wonderful extent. The older methods of surgical intervention were uniformly unsuccessful. In recent times, however, a successful case of trephining and raising the depressed bone on the third day after birth has been reported by Smith (N. Y. Journ. of Obst., May, 1893, 712). Facial paralysis—usually the result of pressure from forceps—is not a serious condition, and spontaneously improves in a short time.

INJURIES TO OTHER PARTS.

Dislocations and fractures are occasionally spontaneous, but usually result from violent efforts at extraction. They may occur legitimately under certain circumstances, in the practice of the most conscientious practitioners. Still, as far as possible, they ought to be avoided. In cases of maternal hemorrhage or convulsions labor must at times be expedited, and it is usually after versions that these injuries occur. Frequently, in the interests of the child—as in cases of intra-uterine asphyxia, displacement of limbs, prolapsus of the cord—the hurried efforts at extraction may produce the same result. After birth such children should be carefully examined and proper treatment at once resorted to. As the prognosis, under these circumstances, is excellent, the criminal negligence of its oversight is apparent. The writer has been sufficiently unfortunate to have met six or eight such cases in his practice, but, under appropriate treatment—usually the reduction and application of a light plaster-of-paris splint in case of fracture—they have uniformly done well.

Injuries to the spinal column and internal organs—such as the kidneys, liver and spleen—have been frequently reported and are

usually fatal. They are of interest from a prophylactic standpoint in emphasizing the fact that the fetus at term can only withstand a limited amount of violence with impunity.

CONGENITAL DISEASES.

Various congenital diseases may be responsible for the death of the child within the first hours or days of life. Congenital debility is usually held responsible for all.

Congenital Rachitis has been sufficiently described elsewhere.

Congenital Syphilis is one of the most important of this group. In many cases the children are premature or still-born; in others the disease only manifests itself some time after birth.

Congenital hydrocephalus, if advanced, usually impedes labor sufficiently to cause the death of the child previous to birth. In some cases the degree of congenital debility is sufficient to early extinguish the life of the child. In exceptional cases growth is not impeded, and such children may grow to adult life with impaired brains.

Congenital deficiencies in the structure of the heart—such as patent foramen ovale or valvular lesions—may give rise to that cyanotic condition of the infantile surface known as the "morbus ceruleus." Severe grades of patent foramen ovale are apt to prove fatal shortly after birth. The compensatory varieties may persist and admit of growth to adult life. The valvular lesions are usually located in the right side of the heart. The writer has, however, met a number of instances in early infancy of lesions in the left side of the heart—particularly mitral insufficiency. It is interesting to note that one of the cases collected by the writer and referred to in the early part of this essay presented the lesions of ulcerative endocarditis.

Congenital hemophilia or the hemorrhagic diathesis is very exceptionally the cause of infantile death shortly after birth. Townsend recently reported a series of fifty cases on the hemorrhagic disease of the new-born, and concludes the disease to be of an infectious nature, but dependent on a number of causes (Arch. of Ped., 1894, ix. 559). The writer has had the opportunity of following for years a number of families afflicted with hemophilia in which the children were apparently healthier than the parents. Occasionally, however, new-born children die shortly after birth from uncontrollable spontaneous hemorrhage from the navel or elsewhere—as after the rite of circumcision

—which can fairly be ascribed to this disease. The fact that some of these children survive such hemorrhages and fail to have them repeated in later life is explained by Grandidier in the following manner: He believes that, in the processes of development from fetal to extra-uterine life, the "transitory hemorrhagic diathesis" becomes extinguished with the completion of this change.

Congenital defects of the rectum, mouth, or other parts, may indirectly lead to the early death of the new-born infant. Imperforate anus or rectum will naturally cause the child's death unless very radical treatment be at once resorted to. The careful search for the intestinal pouch and its attachment to the anal orifice offers the only prospect of life for these infants. Fissure of the palate or hare-lip may interfere to such an extent with the nutrition of the infant as to cause its death. Careful feeding during the first few weeks of life, and later proper surgical intervention, will materially improve the prognosis. The writer has, in a number of instances, operated for hare-lip within the first weeks of life with perfect success.

CHAPTER XXXIV.

FETAL CAUSES FOLLOWING LABOR—(Continued.)

UMBILICAL HEMORRHAGE.

Two varieties of umbilical hemorrhage are usually described: 1, from the vessels of the umbilical cord; 2, from the navel-wound. Negligence in tying the cord is usually responsible for the first variety. Although Fürth met only thirteen cases of umbilical hemorrhage in 50,000 new-born children, it is said to occur with much greater frequency. The writer has certainly met with a dozen cases in less than 5,000 new-born children.

In the majority of cases, after ten or fifteen minutes, the blood-pressure in the cord sinks, and, even without a ligature, no serious hemorrhage can take place. This sinking of the blood-pressure can readily be confirmed by any observant accoucheur. Where the muscular layer of the blood-vessels is sufficiently developed it is possible occasionally for hemorrhage to occur. Likewise, in premature children with imperfect respiration, or in full-term asphyxiated children with extensive pulmonary atelectasis, the tension of the umbilical circulation may be sufficient to give rise to dangerous hemorrhage from neglect in properly securing the cord (Runge). The writer has seen cases of spontaneous rupture of the cord which were accompanied with no hemorrhage at all. The mere act of rupturing probably elongates and twists the vessels, thus closing their mouths. A number of cases, however, in which the ligature slipped, were followed by decided hemorrhage, but none of them proved fatal. It is the physician's duty, however, to carefully apply the ligature, and, as a matter of routine, to quietly instruct the nurse how to apply a second one in case of hemorrhage. Occasionally, after the cord has fallen off, slight hemorrhage may come from the vascular stump. In such cases the application of the solid stick of nitrate of silver, an antiseptic powder, or compression, will suffice.

Secondary or idiopathic hemorrhage from the navel-wound is very rare. The writer has only met one case. Authorities state that a few days after birth—most frequently the fifth day—blood begins to gush as from a sponge through the umbilical aperture, and is not controlled by additional ligatures about the cord. This may continue for hours or days and cause the death of the child. The hemorrhage is usually of an intermittent character, and very deceptive regarding the influence of therapeutic measures. It is frequently associated with hemorrhages in other parts (Grandidier). Besides the hemophilic state, this form of umbilical hemorrhage may occur in connection with congenital syphilis, sepsis, and acute fatty degeneration of the newly-born (Buhl's Disease).

In the treatment of the writer's case the use of styptic applications and compression proved futile. Finally, after forty-eight hours, the method of Dubois (recommended nearly fifty years ago) proved successful. Two hare-lip pins were passed at right angles to each other through the circle of skin surrounding the umbilicus. A figure-of-eight silk suture was next passed about each needle, and then, in a circular manner, the silk was wound beneath both and tied. The bleeding ceased immediately and permanently. After several days the needles were removed.

GASTRO-INTESTINAL HEMORRHAGE OR MELENA OF THE NEWLY-BORN.

This disease was originally described by Ebart in 1723. It develops between the first and seventh days after birth, and is characterized by the discharge of dark masses of blood from the stomach and bowel, due to hemorrhage in the gastro-intestinal tract. Over one-half of the children die (Silbermann). It is said to occur once in about seven hundred to one thousand new-born infants. Still, with his vast experience, Henoch claims to have met with only fourteen cases.

Melena may occur in connection with—1, constitutional or general diseases in the form of secondary gastro-intestinal hemorrhage; and, 2, as a local affection of the gastro-intestinal tract (Runge). The first set of cases include such general diseases as syphilis, sepsis, acute fatty degeneration (Buhl's Disease) and, possibly, hemophilia. The local affections may consist of—1, erosions or ulcerations in the stomach, intestines, or œsophagus (Henoch), originating in traumatisms during

birth; or, 2, they may be due to the changes in circulation after birth (Loranchet); or, 3, to emboli from the umbilical vein, or from a secondary thrombus of the ductus Botalli (Landau); or, 4, to the lodgment of bacilli (Neumann, Rehn).

V. Prenschen divides melena into two similar groups: 1, those occurring in healthy children and due to injuries sustained during labor; and, 2, those occurring in connection with general diseases and not related to labor. Epstein and others have called attention to the relation between sepsis and hemorrhages in the newly-born. Kundrat and Widerhofer refer to four groups of cases in the newly-born with gastro-intestinal hemorrhages: 1, those presenting a healthy appearance with hyperemia of the mucous membranes; 2, those resulting from an interference with the circulation during or following birth; 3, those resulting from pathological changes, as pyemia; 4, those due to hemophilia.

The symptoms usually begin about the second day after birth. Bloody vomiting may occur alone or associated with intestinal hemorrhage. Collapse symptoms from loss of blood soon manifest themselves, and the children may die in twelve to twenty-four hours, or go on to recovery. The writer has seen three cases with the following histories:

Case I. Tenth child, female, difficult labor, child born asphyxiated and over an hour consumed in efforts at resuscitation. Since birth it has been very feeble. Bloody vomiting. Umbilical hemorrhage. No blood elsewhere. After twenty-four hours the pale, exsanguinated and collapsed baby died. Diagnosis, Melena due to traumatisms during birth.

Case II. Fourth child, female, labor easy, no coil about the neck, no asphyxia, fairly developed, bright eyes, no jaundice. On the third day blood repeatedly gushed from the mouth in half-cupful quantities, and once a clot was brought out. The diapers contained dark blood mixed with meconium. No bleeding from nose, vagina, or elsewhere. Diagnosis, Melena Neonatorum. In this case the child was kept perfectly quiet and was given cracked ice, lime-water, and iced milk from the spoon. This baby recovered.

Case III. Fifth child, male, labor protracted over several days, difficulty with the shoulders. Born asphyxiated and required vigorous slapping over the nates to effect respiration. Directly after birth the

scrotum was noticed to be large and the seat of a hematoma on the left side. Later in the day a little free hemorrhage occurred from the space between the first and second toes of the right foot. On examination a bluish discoloration was found. The passages were found to be tarry and contained blood. On the third day umbilical hemorrhage set in. The child seemed to be suffering great intra-abdominal pain, from the way it was drawn together—probably from internal hemorrhage or inflammation. Ecchymotic spots appeared over several portions of the surface of the body. Urine showed no blood, but became suppressed. The child died after several days, but no autopsy was granted. As the family history was free from syphilis or hemophilia, the diagnosis of melena, or purpura hemorrhagica, was very probable, with a possible relationship between the two.

The therapeutic indications consist in checking bleeding as far as possible and maintaining the strength of the child. Cold applications to the abdomen—surrounding the upper and lower limbs in flannel at the same time (Henoch)—iced milk, perchloride of iron (Vogel), and ergot should be tried. It is well to have these children kept on their backs and moved as little as possible.

Literature Concerning Melena of the Newly-Born.

Loranchet: On Melena; Reference in Am. J. Med. Sc., Jan., 1894, 103.
Gärtner: On Melena, Centralbl. f. Gyn., 1894, xxix. 691.
Rehn: The Etiology of Melena; Centralztg. f. Kinderheilk, 1878, xv. 227.
Neumann: Case of Melena; Arch. f. Kinderheilk, 1891, xii. 54.
Kundrat Widerhofer: Gerhārdt's Handbuch, etc., iv.
Henoch: Lectures on Diseases of Children.
Vogel and Biedert: Diseases of Children.
Runge: Diseases of the First Days of Life.

CHAPTER XXXV.

FETAL CAUSES FOLLOWING LABOR—(Continued.)

TRISMUS NEONATORUM.

Although Hartigan observed fifteen cases of this disease directly after birth, most cases begin later. The umbilical wound, more rarely other wounds, may become infected, through uncleanliness of the hands or dressings, with the bacilli of tetanus (Nicolaier), resulting in the production of ptomäines (Brieger), the chief of which is tetanin. Very generally distributed, the bacilli of tetanus are chiefly found on the surface of the ground rendered impure by sweepings and dust, as well as in the dirt and dust of dwellings (Beumer). Thus, at times, these bacilli may reach the imperfectly protected navel-wound. Or, the cases may be carried from one to another. The possibility of direct inoculation has been proved experimentally by Nicolaier, Rosenbach, and Kitasato. Or the disease may be carried from the newly-born to the mother (Heinricius). Trismus neonatorum differs from the tetanus of adults in that the spasm of the maxillary muscles is primarily more pronounced, and only later followed by general tetanus.

The disease generally manifests itself between the fifth and twelfth days after birth, is chiefly met with in the poorer or tenement-house districts, and has in certain distant islands—Hebrides, Guianas, Cuba (Labonne, Hartigan)—been found endemic. Certain races—particularly the Negroes—are more frequently affected (Hirsch, Hartigan). During epidemics of puerperal fever, these cases are said to occur more frequently. J. Lewis Smith points to its frequent occurrence in shanties. A series of thirty-seven cases was traced in one town, by Keber, to the practice of a single midwife, who was unable to appreciate the excessive heat of the children's baths with her hand. Injuries to the child's head, cerebral compression, spinal concussion, overlapping of the cranial bones in the occipital region, have all been held responsible for this disease. Hartigan estimates that 25,000 children succumb yearly to this disease in the United States alone.

The first symptom the child presents is difficulty in nursing, which progressively becomes worse until the lower jaw becomes fixed, at a short distance below the upper jaw, and all of the muscles of mastication become hard and strongly contracted. This constitutes the trismus. Later the other muscles of the body become involved, until, finally, the usual picture of tetanus is presented. The writer has met two cases of this disease of which he has notes:

Case I. Baby M., third child. Labor easy, excepting for a little traction of the head to deliver the shoulders. The child was born asphyxiated and passed into a rigid condition lasting several seconds. After vigorous slapping of the nates, respiration set in. Excepting great restlessness, the child presented nothing unusual until the fifth day, when the lower jaw was found to be rigidly drawn up, only admitting of the insertion of the tip of the little finger, and completely interfering with the act of nursing. Presently the entire body became involved in the spasm, and, after thirty-six hours, the child died. It is of decided interest to note that, shortly before this, another newly-born child had died in the same tenement-house, in the care of another physician. The two families were on very neighborly terms.

Case II. Baby R., three days old. Very small child, suggestive of prematurity. Nature of labor not noted. Forty-eight hours after birth it ceased nursing, and passed into a collapsed state. Spasm of the jaws, followed later by general spasmodic condition of the entire body, next appeared. A curious local blueness and congestion of the entire left side of the body was noted. The child died after several days.

These cases, as a rule, offer an unfavorable prognosis, and, after from one to six days, death ensues. The treatment is chiefly prophylactic. Careful aseptic treatment of the navel-wound with sterile gauze or clean soft linen or asepsis in the rite of circumcision, or other operative procedures, is absolutely essential. Education of midwives and medical supervision of nurses are necessary. Only clean towels, clean scissors, clean string, and clean hands, which do not come directly or indirectly in contact with the dust of the room, are permissible near the exposed body of the newly-born child. The temperature of the bath must not exceed 100° F. The physician attending a case of tetanus must be very particular regarding personal disinfection in every other case of labor. As regards medicinal treatment,

chloral ranks most highly in the successful cases reported so far; opium, chloroform, and the bromides have proved less beneficial. In this country Holt succeeded in saving a seventeen days' old baby with eight-grain doses of bromide of potassium, repeated every three hours, until one hundred and twenty-eight grains were given. Extract of calabar bean, amyl nitrite, atropin, musk, and sulphonal have also been used. Frequently repeated warm baths have been recommended. Nourishment offers a serious problem in these cases. Sometimes soft catheters passed into the œsophagus or rectal nutrient enemata are advisable. Wilhite noted depression of the occipital and parietal bones, and succeeded in saving one child by resort to persistent and prolonged lateral decubitus. Baginsky tried to cure one case by hypodermic injections of the blood-serum of an animal rendered immune to tetanus, but failed, as he thinks, from insufficient quantity. In all cases antiseptic treatment of the navel is indicated.

Literature Concerning Trismus Neonatorum.

Keber: Hot-baths an Etiological Factor in Trismus; Monats. f. Gebtsk., 1860, xv. 368; also 1869, xxxiii. 66.
Runge: A Case of Tetanus Neonatorum, Recovery; Med. Rec., Dec. 1, 1892, 638.
Peiper: Etiology of Trismus; Deutch. Arch. f. Klin. Med., 1891, xlvii. 182.
Beumer: Etiology of Trismus; Ztsch. f. Hygiene, 1888, iii. 242.
Kitasato: Experimental Investigations, etc.; Ztsch. f. Hygiene, 1889, ii. 225.
Brieger: Tetanin in Tetanus; Berl. Klin. Woch., 1888, xvii. 329.
Nicolaier: Infectious Tetanus: Deut. Med. Woch., 1884, lii. 842.
Hartigan: Trismus Nascentium; Am. J. Med. Sc., 1884, lxxxvii. 84.
Baginsky: Text-book on Diseases of Children, Chapter on Trismus.
Rosenbach: Etiology of Human Tetanus; Arch. f. Klin. Chir., 1887, xxxiv. 306.
Holt: Bromide of Potassium in Trismus; Bost. Med. & Surg. Journ., 1883, 370.
Wilhite: Trismus Nascentium; Am. J. Med. Sc., 1875, lxix. 375.
Smith: The Etiology of Tetanus Neonatorum; Arch. Paed., Dec., 1894, 876.

CHAPTER XXXVI.

FETAL CAUSES FOLLOWING LABOR—(Continued.)

SEPSIS IN THE NEWLY-BORN.

1. From the Navel-Wound.—Although septic processes may develop in any wound on the newly-born child, the most usual site is the navel. Of two hundred and eighty-one children dying at the Munich Maternity, v. Hecker found that one hundred and thirty-eight, or sixty-three per cent., succumbed to infectious processes. According to Baginsky, v. Hecker and others, such infection may occur within the uterus, but is most usually extra-uterine. In 1700 deliveries at the Innsbruck Maternity, Ehrendorfer states that eighty-one children died, and of these sixteen were clearly proven to have been infected at the navel. The careful observations of Eröss in 1000 newly-born children demonstrated the fact that mummification of the cord was the exception and not the rule. He found that six hundred and eighty of these children presented pathological processes which often proved fatal.

Among the local affections of the navel-wound may be mentioned excoriations, fungus, ulcer, abscesses, omphalitis, and gangrene. Eröss found that gangrene of the navel was apt to be very readily followed by systemic infection. Fürth met with one hundred and ninety-one cases of gangrene of the navel, of which one hundred and sixty-nine proved fatal. Since the introduction of antiseptic methods the condition has become infrequent. Mild cases may recover, but severe cases are usually fatal within five days. The gangrenous process may be associated with peritonitis or intestinal gangrene. Profuse hemorrhages, or general septicemia, have at times caused death. Sometimes gangrene is secondary to general septicemia. The treatment of these various conditions is chiefly local, and ordinary antiseptic surgical principles must be followed. Preventive aseptic dressing of the navel is of primary importance. Abscesses must be

incised early. Necrotic and gangrenous tissues must be removed. Fungi must be touched with the solid stick of silver.

In all cases the daily bath should precede the dressing of the navel-wound; then the wound must be cleansed with mild antiseptic solutions, dusted with powders, such as salicylic acid, starch, talcum, iodoform, dermatol, etc., and finally covered with an antiseptic dressing.

Diseases of the umbilical vessels may follow a peripheral inflammation by inward extension, and result in arteritis or phlebitis, with secondary thrombus formation. Inflammation of the arteries is now considered far more serious than that of the veins, on account of its more frequent occurrence. In sixty autopsies of septic infection, emanating from the umbilicus, Birch-Hirschfeld found phlebitis only eleven times, venous thrombi four times, arteritis alone thirty-two times, and arteritis with phlebitis three times. Fürth met arteritis umbilicalis in three hundred and eight cases, of which fifty-eight died. He states that phlebitis umbilicalis is rarely met with, and is more fatal. In fifty-five autopsies in cases of disease of the umbilical vessels in newly-born children, Runge found arteritis present in fifty-four cases—twenty-two being complicated with pneumonia, sixteen with other lesions—and only once did he meet phlebitis, and then only associated with arteritis.

The symptoms present nothing characteristic. The writer recently saw a case in a baby eight days old, in a poor family. The temperature (rectal) was 103° F. The whining baby nursed feebly and had diarrhœa. The umbilical wound was dressed by a slovenly midwife, and presented a suppurating aspect. With no other treatment beyond carefully cleansing the wound and applying a dressing of powdered boracic acid and iodoform gauze, the temperature spontaneously fell to the normal in twenty-four hours, and the child went on to recovery. This was evidently an incipient case. In other cases nothing is suspected until the child suddenly dies. In some the navel presents an inflammatory appearance. Often the child presents nothing but fever, alternating with collapse and wasting, to indicate the existence of sepsis. At times an ulcer of the umbilicus may be present. Therefore every case of diseased navel runs the risk of the development of arteritis by inward extension. In cases of phlebitis the presence of jaundice is said to be characteristic. Occasionally, complicating pneumonia

or peritonitis can be diagnosticated before death. The existence of umbilical inflammation with abscess, associated with arthritis of various joints and a febrile movement, render the diagnosis very probable (Runge). At times, gentle pressure from the symphysis in an upward direction may squeeze out pus from the arteries and render the diagnosis positive.

The infection may originate in a putrefying cord, unclean fingers or instruments, other septic navels (in hospitals), maternal septicemia, or decomposed lochial discharge. The treatment is chiefly prophylactic, and consists in preventing putrefaction of the cord by the dressing, frequent change, dryness of the child, loose clothing, and absolute cleanliness, from the time the cord is first touched until the wound is completely healed. Cholmogoroff found micro-organisms in the cord under all dressings, but concluded that plaster-of-paris dressings offered the best safeguard against pathogenic germs. The actual treatment of the disease is practically nil. Breast-milk and small doses of alcohol must be given internally; the navel must be thoroughly disinfected and dressed antiseptically. Abscesses must be treated surgically.

2. Cases Originating from Sources other than the Navel.—Accidental injuries or operations with unclean instruments—for mammary abscess, tongue-tie, or circumcision—may be followed by sepsis. Abrasions of the buccal mucous membrane, or slight injuries to the anus, may be followed by the same result. The mucous membrane of the female genitals may be the seat of diphtheria or gangrene. In many cases of sepsis of the newly-born no local cause of infection can be discovered. During intra-uterine life, when the mother is suffering from septicemia, the child may become infected from the placenta or from the amniotic fluid. In some cases the premature rupture of the membranes admitting air into the uterus may cause putrefaction of the liquor amnii without disturbing the mother's health, whereas the fetus, through premature inspiration of this liquid, may acquire septic pneumonia. In this connection Légry, during the past year, reports the interesting case of a child which lived ten hours with imperfect respiration. The autopsy showed fibrin and sanguinolent fluid in the pleural cavities, with streptococci. During the last month of pregnancy the mother acquired a violent vaginitis. Three days preceding delivery the waters ruptured, and the author believes that in this

manner the infection was carried upwards to the child. It is only proper to add that the writer, as well as others, has had cases of children which had breathed prematurely in foul-smelling liquor amnii, and which, after resuscitation, presented no symptoms of sepsis.

Miller has claimed that septic poisons may be transmitted to the child from the mother's milk. Bacteriologically it has been found that the milk of women suffering from septicemia may contain pathogenic micro-organisms (Escherich), but this has been contested by others (Bumm). More recently Cohn and Neumann claimed that the milk of healthy women may contain bacteria, and, during the past year, Ringel has published confirmatory views. The mouths of nursing infants, according to the last observer, contain corresponding bacteria in their secretions. The writer has seen large numbers of children continue nursing during puerperal fevers without any harm. In thirty-six newly-born children which had died from septicemia, Runge found that in thirty the infection came from the navel, and in three from accidental injuries.

The local symptoms, in those cases not originating from the navel, depend on the site of entrance of the poison, but are usually associated with suppurating or decomposing processes. Epstein calls attention to the mucous membrane of the month as a source of infection of the newly-born. He distinguishes the lesions present as septic catarrh, septic croup, and septic diphtheria. These processes may extend to the intestinal tract and give rise to deeper lesions. The most robust children may rapidly die. Metastatic inflammations and extravasations may occur. The constitutional symptoms and the changes in the distant organs are the same as those occurring in connection with sepsis from the navel. Peritonitis, pneumonia, pleurisy, abscesses in the joints and elsewhere may all be present. Progress may be slow or rapid. Fever with collapse, skin rashes, meningitis, gastro-enteritis, may present their various symptoms.

The prognosis is bad. Prophylaxis is again the most important element in the treatment. Operations must be thoroughly aseptic. Children must be rapidly resuscitated at birth and foreign bodies removed from the air passages. Care in cleansing the mouths of newly-born children must be exercised. Actual treatment must be based on antiseptic surgical principles.

Literature Concerning Septicemia of the Newly-Born.

Eröss: Observations in 1,000 New-Born Children; Arch. f. Gyn., 1891, 419.
Ehrendorfer: Present Aspect of Navel Infection; Central. f. Gyn., 1894, xli. 996.
Baginsky: Text Book on Diseases of Children.
Runge: Diseases of the First Days of Life.
Fürth: Sepsis of the newly-born; Wiener Klinik, 1884, xi. 281; also xiii. 351.
Birch-Hirschfeld: Sepsis of the newly-born; Berl. Klin. Woch., 1879, xxi.
Légry: Intra uterine Infection of Fetal Lungs; Central. f. Gyn., 1894, xxxii. 784.
Baginsky: Two Cases of Pyemia in Young Infants; Virchow's Arch., 1889, cxv. 460.
V. Hecker: On the Pathology of the newly-born; Arch. f. Gyn., 1876, x. 537.
Cholmogoroff: Micro-organisms of the Navel; Ztsch. f. Geb. u. Gyn., 1889, xvi. 16.
Ringel: Bacteria of the Human Milk; N. Y. Med. Rec., Aug. 11, 1894, 174 (Ref.).
Cohn and Neumann: Bacteriological Examinations of Human Milk; Virch. Arch., 1891, cxxvi. 391.
Bumm: Etiology of Puerperal Mastitis; Arch. f. Gyn., 1886, xxvii. 460.
Escherich: Bacteriological Examinations of Mother's Milk; Fortschr. der Medicin. 1885, viii. 57.
Epstein: Septic Diseases of the Infantile Mucous Membranes; Prag. Med. Woch., 1879, xxxv. 341.

CHAPTER XXXVII.

FETAL CAUSES FOLLOWING LABOR—(Continued.)

ERYSIPELAS OF THE NEWLY-BORN.

During intra-uterine life or shortly after birth it is possible for the child to become infected with erysipelas from the mother. Henoch divides the cases into two sets: 1, those due to puerperal infection from maternal sepsis; 2, those due to an injury on the child's body. The umbilicus is the most frequent point of origin of this disease. Still, injuries or operations about the anus or genitals may become infected with the poison. In some children sepsis and erysipelas are associated from the beginning. This form is fatal (Atkinson), but is questioned by Gusserow. Healthy children may become infected from the midwife, mother, nurse, or physician. These cases may likewise prove fatal, but the autopsy fails to show the presence of sepsis as in the former set of cases.

It has been fairly proven that maternal erysipelas during the pregnant state may invade the uterine cavity and lead to abortion (Hervieux, Wardwell). Schoenfeld reports the case of a child infected on the fourth day after being put to the breast of a mother who had just recovered from an attack of erysipelas.

The local appearances in the newly-born are not different from those shown by the disease in later life. It is said to spread more rapidly. Occasionally portions of the skin may become gangrenous. The constitutional symptoms include hyperpyrexia, restlessness, collapse, and, after several days, death.

In new-born infants the prognosis of erysipelas is very gloomy. Prophylaxis plays a most important rôle in this disease. With the first evidence of maternal erysipelas the child must be removed to other parts. Physicians attending cases of erysipelas must be particularly careful in regard to thorough disinfection before approaching the child's navel or other wounds. Besides nourishment and alcoholic stimulants, the local treatment consists in the employment of lead and

opium wash externally, or repeated painting of the diseased surface with compound tincture of benzoin. Carbolic acid washes must be avoided in new-born children on account of the great danger of poisoning by absorption.

Literature Concerning Erysipelas of the Newly-Born.

Stratz: Intra uterine Erysipelas; Centralbl. f. Gyn., 1885, xiv. 213.
Gusserow: Erysipelas and Puerperal Fever; Arch. f. Gyn., 1885, xxv. 169.
Lebedeff: Intra-uterine Infection with Erysipelas; Ztsch. f. Gebts. u. Gyn, 1886, xii. 321.
Kaltenbach: Intra uterine Erysipelas; Central. f. Gyn., 1884, xliv.
Runge: Intra-uterine Erysipelas; Central. f. Gyn., 1884, xlviii.
Wardwell: Erysipelas Complicating Pregnancy; Am. J. Med. Sc., 1884, 349.
Atkinson: Erysipelas in Children; Bost. Med. and Surg. J., Jan., 1887, 232.
Henoch: Text-Book on Diseases of Children.

Icterus of the Newly-Born.

Of six hundred and ninety new-born children studied by Kehrer, four hundred and seventy-four acquired icterus during the first eight days of life, and, in seventy, the icterus was extreme. The jaundice may be idiopathic, or merely one symptom of a variety of disorders. Some authors—like Kehrer—believe that icterus owes its origin to mechanical causes in the liver, as congenital narrowing of the gall-passages, insufficient contraction of the ductus choledicus, etc. Others (Virchow, Violet, Hofmeier) believe that changes in the blood-cells are responsible for the jaundice. Hofmeier has called attention to the almost constant presence of uric acid infarctions in the kidneys and albumin in the urine in icteric children. He believes that this distinctly indicates an interference in the nutritive processes of the newly-born with resulting icterus. Runge is probably nearest the truth in allowing both a hematogenic and hepatogenic origin for this disease.

The usual form of icterus neonatorum is idiopathic. It is a mild disorder and quickly disappears. It differs from the obstructive jaundice of adults, in that the surface of the body becomes discolored before the conjunctivæ. During the icteric state the children lose in weight. The urine may present the characteristic golden-yellow color of jaundice, and the stools may be clay-colored. The treatment consists in rapid resuscitation if born asphyxiated. Premature children require particular attention. Syrup of rhubarb is a popular and useful remedy. Calomel, in doses of gr. $\frac{1}{20}$, is a useful hepatic stimulant.

Icterus, however, may be a prominent symptom in a variety of conditions, such as sepsis of the newly-born, duodenal catarrh, hepatic syphilis, obliteration of the bile-passages, acute fatty degeneration (Buhl's Disease), or congenital cirrhosis of the liver. Some of the children may be born jaundiced, but usually the icterus appears at various periods after birth. In acute yellow atrophy of pregnancy, the fetus may be also jaundiced. In all these cases the jaundice is very marked, and the children present a very sick appearance. Positive diagnosis is practically impossible, and treatment is apt to be of little service. Still, nourishment and stimulation must be pushed.

LITERATURE CONCERNING ICTERUS OF THE NEWLY-BORN.

KEHRER: Studies on Icterus Neonatorum; Obst. Jahrb. f. Ped., 1871, i. 71.
ROSENBERG: Hepatic Circulation etc.; Virchow's Arch., 1891, cxxiii. 17.
VIOLET: Jaundice of the Newly-Born; Virchow's Arch., 1880, lxxx. 353.
HOFMEIER: Jaundice of the Newly-Born; Ztsch. f. Gebst. u. Gyn., 1883, viii. 287.
RUNGE: Diseases of the First Days of Life.

ACUTE FATTY DEGENERATION OF THE NEWLY-BORN (BUHL'S DISEASE).

In 1861 Buhl first described this disease as a parenchymatous inflammation terminating in fatty degeneration of the heart, liver and kidneys. Hemorrhages may arise from the navel, stomach, or intestines. Ecchymosis may be found in the skin, and bloody extravasations may be discovered in the brain. The etiology of the disease is obscure. Runge believes the disease to be a sort of septic infection, with no perceptible changes at the portal of entrance of the poison. Baginsky suggests that the three diseases—acute fatty degeneration, epidemic hemoglobinuria, and icterus—being related physiologically and etiologically, ought to be regarded as different grades of the one pathological process under the heading, "Malignant Icterus of the Newly-Born."

The clinical picture may be introduced by asphyxia at birth. Efforts at resuscitation may be followed by partial success or by complete failure. Thus many cases are readily overlooked and such deaths are usually attributed to asphyxia. Those children which survive may have bloody stools, bloody vomit, and, frequently, after the cord comes away, bleeding from the navel. The skin is at first cyanotic, and later jaundiced. Hemorrhages may occur in the various mucous membranes and skin. Œdema may appear. Collapse rapidly sets in,

and, within a fortnight, these children usually die. Bigelow lost eight out of ten cases (Baginsky). The diseases may occur in groups of cases. Thus Ashby met three cases in one family (Biedert).

The diagnosis can only be positively determined with the microscope, and there can be no doubt that, in this country as well as in Europe, most cases are overlooked and such deaths are wrongfully attributed to congenital debility, or umbilical hemorrhage, or melena. Poisoning by arsenic and phosphorus must be excluded by chemical tests. Sepsis of the newly-born must be excluded. Hecker states that microscopically it is next to impossible to distinguish this disease from deaths by suffocation. Hence, from a forensic standpoint, all such cases must be examined by the microscope.

The prognosis has hitherto been practically hopeless. In the treatment the indications are to overcome asphyxia, to check hemorrhage, and to preserve the strength.

LITERATURE CONCERNING ACUTE FATTY DEGENERATION OF THE NEWLY-BORN.

V. HECKER: Pathology of the Newly-born; Arch. f. Gyn., 1876, x. 537.
BAGINSKY: Text-book on Diseases of Children.
VOGEL and BIEDERT: Text-book on Diseases of Children.
RUNGE: Diseases of the First Days of Life.

EPIDEMIC HEMOGLOBINURIA WITH JAUNDICE OF THE NEWLY-BORN (WINCKEL'S DISEASE.)

In 1879 Winckel observed an epidemic of this disease affecting twenty-three new-born children, of which nineteen died. Wolenzynski recently reported two epidemics of the same disease, involving twelve children, of whom eleven died. Baginsky has met two cases sporadically.

About the fourth day these children are noticed to become cyanotic, icteric and restless. The respiration becomes rapid, without marked acceleration of the pulse or elevation of the temperature. The characteristic feature of the disease is the light-brown color of the urine, due to hemoglobin. Albumin and epithelial cells may also be present. The blood shows an increase in the number of white cells. Convulsions may later develop, and be followed by death.

The post-mortem examination may reveal cyanosis and jaundice of the skin. Disease of the umbilical vessels is almost uniformly absent.

The kidneys are the seat of a characteristic lesion; the cortical substance is discolored brown and spotted with small hemorrhages, the pyramidal substance is dark-red or striped with delicate dark lines, converging to the papillæ. The discoloration is due to the filling up of the straight urinary tubules with granular crystals of hemoglobin. No blood globules are found. Punctate hemorrhages may be discovered in the pericardium, pleura, endocardium, kidneys, meninges, capsule of the liver, and in the mucous membrane of the stomach and intestine. The spleen may be enlarged, hard in consistency, and dark-red in color. Fatty degeneration may be present in the larger viscera.

Bacteriologically, Birch-Hirschfeld refer to the presence of micrococci in Winckel's cases. Wolczynski again refers to the bacterium coli communis as the characteristic micro-organism present in the effused blood or thrombi, which, on inoculation, proved fatal to animals within twelve to seventy-two hours.

In the epidemics referred to, water used in the bath or in washing the babies' mouths was regarded as the probable source of the trouble. The disease is apt to be confounded most with Buhl's disease, with which it presents many points in common. Epstein believes the disease to be a septic infection, beginning in the gastro-intestinal tract.

The treatment must be entirely of a prophylactic nature. On substituting sterilized borated water in cleansing the babies' mouths for the well water in which the bacteria were proved to be present, Wolczynski reports that no further cases developed.

LITERATURE CONCERNING HEMOGLOBINURIA WITH JAUNDICE OF THE NEWLY-BORN.

WINCKEL: A hitherto undescribed disease in the newly-born; Deut. Med. Woch., 1879, xxiv. 303.

BIRCH-HIRSCHFELD: Pathological Studies in Winckel's Cases, Deut Med Woch., 1879, xxxvi. 463.

WOLCZYNSKI: An Epidemic of Winckel's Disease; referred to in Am. J. Med. Sc., Feb., 1894, 222.

NOTE.—The writer, as the shrewd reader will have observed, has had no experience with the diseases last described, and has drawn freely upon others for his statements. He has included them, however, in this essay because they are so little heard of in this country, and in the hope that those in charge of large maternities will be on the look-out for them.

CHAPTER XXXVIII.

PREVENTION OF INFANTILE MORTALITY; GENERAL CONSIDERATIONS.

Although it is becoming the rule at obstetric clinics and in the practice of the best obstetricians to look after the condition of pregnant women during the months previous to labor, still, in by far the largest, preponderating mass of women, nothing is undertaken or done up to the time of labor. That this is wrong even those who have had little experience will concede, when it is remembered how much can be learned by the skilled hand and ear of the careful physician. We are not directly concerned in this work with the influence of such an examination on the future welfare of the mother; but, as her interests are intimately connected with the welfare of the future offspring, it is well to note just what can be learned by such an examination.

If the pregnant woman makes her appearance before the seventh month a careful history should first be elicited. The age of the patient, primiparity or multiparity or previous occurrence of miscarriages should be noted. The nature of previous labors should be inquired after. Symptoms of blood dyscrasiæ, as syphilis or anemia, should be sought for, and, if found, appropriate treatment should be instituted. The condition of the stomach and bowels should concern us. After looking at the general build of our patient—whether tall or short, obese or slim, œdematous or not—it is our duty to examine the lungs, heart and viscera as far as accessible. Having found these normal, a very important fact to note is the condition of the kidneys, not only once, but repeatedly; for only during the past year has it been the writer's experience to meet a case in which the urine was absolutely free from albumin at the first examination, but within less than two weeks showed 80 or 90 per cent. of this foreign element.

The most important feature of the examination, however, is the one directed toward the uterus and its contents. The shape of the abdomen should be noted and the question of hydramnion considered. Even the question of a true intra-uterine pregnancy, as distinguished from extra-uterine, must be kept in mind. Not only that, but the occurrence of an extra- combined with intra-uterine pregnancy should not be lost sight of, for such cases are on record. The local examina-

tion per vaginam will give valuable information regarding the size of the bony pelvis and the structure of the soft parts, presence of tumors, etc.; this should be supplemented by external measurements. Regarding the child, the examination per abdomen is, in the writer's experience, not reliable unless in cases of thin abdominal walls. The stethoscope will, however, in most cases, determine the fetal heart-beat, the strength and rapidity of which should be noted. Per vaginam it will be possible, as a rule, to map out the fetal head, and its absence will be pretty strong evidence of a mal-presentation. The existence of twins has, in the writer's experience, been one of the most difficult things to determine before actual labor has set in. But, if two fetal heart-beats at different points and with different counts can be heard, the inference can be relied on as fairly positive.

Having looked after the interests of the child indirectly through attending to the general welfare of the mother, having decided that the passages are sufficiently large to permit the labor to go to term without risking the life of the child, having decided that no malposition or maternal dyscrasia makes it desirable to prematurely terminate pregnancy in the interests of either mother or child, we can safely allow pregnancy to go on to term. And here the writer would make a suggestion in regard to those rare cases in which women have gone beyond term. It is, in effect, that it is justifiable in primiparæ, or even in multiparæ with partly contracted pelvis (even though slight), to induce labor at the end of two hundred and eighty days, and, although we have never yet carried out this practice, we believe that experience justifies such a course. For example, the writer recently had a primipara of fair build pass three weeks longer than the expected time, which had been carefully calculated beforehand. The waters broke early, labor was tedious, and after seventy-two hours, with a woman completely exhausted and a pulse-rate of one hundred and twenty per minute (fetal heart barely perceptible)—Tarnier forceps under chloroform were applied to a head impacted in the pelvic strait and not emerged from the cervix. With moderate traction, after twenty minutes, the head was delivered fairly easily, but the shoulders and body were so largely developed that a dangerous amount of traction was required on the child's neck to extract it. The child was excessively large, like a three-months' baby, and profoundly cyanotic. It began to gasp and breathe after a paroxysmal fashion. This con-

timed for eight hours, and then the baby died. This experience has been repeated a number of times in former years in women who later gave birth to living children without trouble, and we think we are justified, in similar instances, to terminate labor at the end of two hundred and eighty days in the hope of having a smaller child which will live, and, certainly, with less danger to the mother. The old cry of meddlesome midwifery will undoubtedly be raised, and the interference will be opposed by the laity; but we, as physicians, with our present knowledge of aseptic methods, have the right to learn from our past experiences and formulate new lines of departure for our future behavior.

During labor the welfare of the child has been sufficiently considered in this essay.

After birth the dangers to the child have not entirely passed, and it is wrong to follow the general practice of handing the baby to the nurse and giving it no further attention. The physician should see that the water of the bath is near to blood-heat (100° F.), and not merely lukewarm, as the nurses like to have it. For these babies have left surroundings with a temperature of 100° (F.), and to thrust them suddenly into a bath of 80° (F.) or less may mean pneumonia and death. But it is well to avoid excessive heat, as cases of tetanus have been traced to this cause. Similarly must the cord be personally supervised by the physician to prevent the premature death of the child from tetanus, or hemorrhage, or sepsis. And all that is here necessary is simple cleanliness. A pair of clean scissors rendered aseptic by boiling several minutes, clean thread from a new spool, and a piece of clean soft linen, are all that is necessary. In a hospital, dried sterilized gauze would be readily obtainable and more suitable. After the mouth and eyes have been attended to, the physician should even keep an eye on the clothing of the baby and the temperature of the room in which it is to be kept. And only here, not before, does the immediate responsibility of the physician cease.

In prematurely born or weakly children the physician should devote himself persistently and devotedly to every detail of surroundings and nourishment, until all danger has passed, as described elsewhere. In asphyxiated children, resuscitated, the character of the breathing must receive the most solicitous attention during the first hours and days of life.

INDEX.

PAGE

ABORTION, causes of 24
Accidents, intra-uterine . . . 94
Accidental hemorrhage 95
Accoucheur, the 11
Accouchement forcé 54
Acute diseases, maternal 33
Acute fatty degeneration of newly-born 171
Albuminuria, maternal 30
Amniotic liquid, putrefaction of . . 39
Anomalies in uterine contraction . . 41
Ante-partum hemorrhage 95
Ante-partum hour-glass contraction. 45
Asphyxia neonatorum 21, 134
etiology and pathology 135
signs 137
symptoms 139
differential diagnosis 141
prognosis 141
treatment 143
Atelectasis 17
Atresia of vulva 46

BAUDELOCQUE SCHATZ method in face cases 103
Bladder, distension of fetal 127
Blood-vessels of fetus 19, 90
Bones of fetus 89
Brain in still-births 17
Braxton-Hicks' method of version . 75
Breech presentation 106
Brow presentation 100
Buhl's disease 171

CALCULI, vesical 46
Cardiac lesions, maternal . . . 29
Catheter in asphyxia 146

PAGE

Causes of infantile mortality . . . 21
maternal, preceding labor . . . 24
maternal, during labor 41
fetal, preceding labor 88
fetal, during labor 97
fetal, directly following labor . 130
Cerebral hemorrhage 152
Cerebral lesions, fetal 89
Cervix, carcinoma of 50
Cervix, cicatrices of 48
Cervix, hypertrophy of 48
Cervix, thrombi of 48
Cesarian section 24, 81
Charpentier de Ribes' method in breech 109
Chest, lesions in newly-born 17
Cholera, maternal 33
Chorea, maternal 35
Chronic chest disorders, maternal . 35
Coiling of umbilical cord 95
Congenital debility 15, 22
defects 156
diseases 155
Contagious diseases, maternal . . . 34
Contracted pelvis, diagnosis in . . 61
summary of treatment 85
Convulsive disorders, maternal . . 23
Craniotomy 86
Cysts of broad ligament and ovary . 59

DEBILITY, fetal 129
Decidua, diseases of 38
Deformities, pelvic 61
Diabetes, maternal 35
Digestive organs, fetal lesions of . . 90
Diseased states of child's head . . . 126
neck and body 127

PAGE

Displacements of uterus 37, 51
Dystocia due to bony parts 61
soft parts 46

ECCHYMOSIS, subpleural . . . 17
Eclampsia, maternal 30
Encephalocele 126
Encephalous monster 17
Enlargement of fetal viscera 128
Erysipelas, maternal 34
of newly-born 169
Etiology of infantile mortality . 16, 21
Extra-uterine pregnancy 37

FACE presentation 101
Fecal impaction 46
Fetal dyspnœa 138
expression 43
pulse 138
Fetus, diseases in utero of 88
excessive development of . . . 124
fevers in 89
Fibroid tumors of uterus 56
Foramen ovale, patent 17
Forceps 44, 70
Forrest's method in asphyxia . . . 149
Fractures 19

GALL-BLADDER in newly-born 18
Growths of cervix 50

HEAD, injuries to fetal 152
Heart, fetal 17, 18, 90, 155
Heart lesions, maternal 29
Hemoglobinuria of newly-born . . 172
Hemophilia 155
Hemorrhages in fetus 17, 18, 152
umbilical 157
gastro-intestinal 158
Hydramnion 38
Hydrocephalus 126, 155

ICTERUS, fetal and newly-born 89, 170
maternal 35
Imperforate anus 18
Inclined positions of vertex 104

PAGE

Induction of labor 66
care of child after 68
Inertia uteri 42
Infantile mortality
maternal causes preceding labor 24
during labor 41
fetal causes preceding labor . . 88
during labor 97
directly following labor . . . 130
Injuries to fetus 153, 154
maternal 36
Intestines, lesions in fetus 17

JAUNDICE in fetus 18, 170

KIDNEYS, lesions in fetus . . 17, 18
maternal diseased 30
Knots in umbilical cord 94

LEAD poisoning, maternal . . . 36
Liquor amnii, premature escape of 42
Liver, lesions in fetus . . . 17, 18, 90

MALPOSITIONS of fetus . . 21, 97
Maternal acute diseases . . . 33
Maternal causes of infantile mortality
preceding labor 24
during labor 41
Maternal constitutional diseases . . 26
death preceding labor 25
injuries 36
hyperemesis 36
malaria 28
measles 33
organic disease of heart or kidneys 29
placental abnormalities 40
shocks 36
uterine abnormalities 37
Melena neonatorum 158
Midwives 11
Morbid anatomy of fetal lesions . . 16
Multiple pregnancy 93, 120

PAGE

NEPHRITIS, maternal 30

ŒDEMA pulmonary, fetal . . . 17
Œdema vulvar, maternal . . 46
Os externum, occlusion of 48
Ossification of fetal skull, premature 126
Ovarian tumors complicating labor . 59

PELVIS, deformed 62
infantile mortality in 63
treatment in 67
Peritonitis, fetal 17, 18, 88
Persistence of hymen, maternal . . 46
Physiology of new-born child . . . 130
Placental abnormalities 40
Placenta previa 40, 53
treatment in 54
Pneumonia, maternal 33
in new-born child 17, 18
Post mortem examinations of newly-born 16
Prague method in breech cases . . . 109
Precipitate labor 41
Prematurity 22, 152
Prevention of infantile mortality . 174
Prolapsus of vagina, maternal . . . 46
of various parts, fetal 122
of umbilical cord 114
Protracted labor 21, 42

RACHITIS, fetal 91, 155
Relapsing fever, maternal . . 33
Respiratory organs, lesions of fetal 89
Rupture of uterus 87

SCARLATINA, maternal 34
Schatz method in face cases . . 102
Schultze method in asphyxia . . . 146
Scrofula, fetal 89
Sepsis, from the navel wound . . . 164
from other sources 166
maternal 34
Shocks, maternal 36
Skin lesions, fetal 18, 89
Smellie-Veit method in breech cases 109
Spleen, fetal lesions of 17, 18, 90
Spontaneous rupture of cord 94
Statistics of infantile mortality . . 13
Stenosis of umbilical vessels 95
Still-births 14, 16
Stomach of newly-born 17, 18
Symphyseotomy 77
Sylvester method in asphyxia . . 145
Syphilis, maternal 26
congenital 90, 155

THROMBI of vulva, maternal . . 46
Tobacco, poisoning by 36
Torsion of umbilical cord 94
Transverse presentation 111
Trismus neonatorum 161
Tuberculosis, maternal 28
Tumors of neck, fetal 127
Typhoid and typhus fevers, maternal 34

UMBILICAL cord, compression of 21
errors in length of 118
hemorrhages from 157
ligation of 132
prolapsus of 114
Urate infarcts 18
Urine, retention of, maternal . . . 46
Uterine abnormalities 37, 51
displacements 51

VAGINAL atresia 46
hernia 46
neoplasms 47
Vaginismus 47
Version 73
external 74
bi-polar 75
internal cephalic 74
podalic 75
Vertex presentations 97

WALCHER'S position . . . 71
Winckel's disease 172